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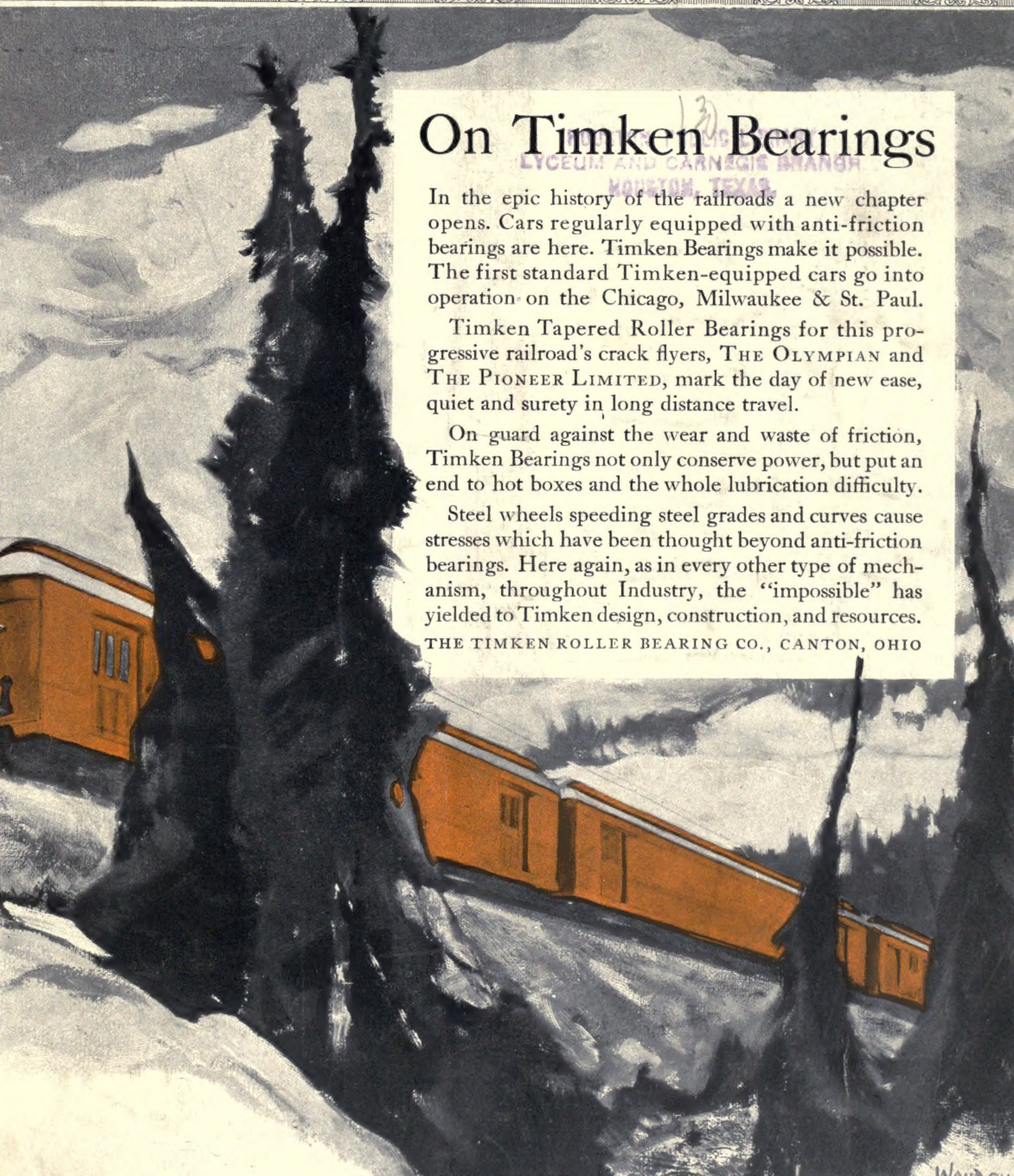
# ELECTRIC RAILWAY JOURNAL




## On Timken Bearings

In the epic history of the railroads a new chapter opens. Cars regularly equipped with anti-friction bearings are here. Timken Bearings make it possible. The first standard Timken-equipped cars go into operation on the Chicago, Milwaukee & St. Paul.

Timken Tapered Roller Bearings for this progressive railroad's crack flyers, THE OLYMPIAN and THE PIONEER LIMITED, mark the day of new ease, quiet and surety in long distance travel.

On guard against the wear and waste of friction, Timken Bearings not only conserve power, but put an end to hot boxes and the whole lubrication difficulty.

Steel wheels speeding steel grades and curves cause stresses which have been thought beyond anti-friction bearings. Here again, as in every other type of mechanism, throughout Industry, the "impossible" has yielded to Timken design, construction, and resources.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO


LYCEUM AND CARNEGIE BRANCH
HOUSTON, TEXAS

# Protection

## against extreme conditions

TO shoot through the clouds, a hundred miles an hour or more, the aviator needs special protective dressing—ordinary clothes won't do.

Railway motors also operate under conditions that call for more than "save-the-surface" varnish for insulation.

To effectually resist the vibration, the moisture and the extremes of heat and cold, the insulating varnish must have special characteristics. Westinghouse varnish No. 335 has those characteristics. This special varnish is an important factor in Westinghouse motor performance. Keep it on hand for any motor insulation that may become necessary from time to time. You can buy it by the can.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

TOUGHER THAN RHINOCEROS HIDE

# Westinghouse

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INSULATING Varnish

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# ELECTRIC RAILWAY JOURNAL

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*Vol.* 69
*No.* 10

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## *Ripley's Riddle Answered*

DESPITE the allegations by Professor Ripley that annual reports of public utility companies unravel more blue ribbon than financial mysteries, many pertinent facts on the operating end of the railway business are contained in these statements. Besides the usual data on revenues, expenses and traffic in the president's address to the stockholders is included also a review of the year's activities—how the bus developed business in previously unserved territory; how track extensions were made; new equipment purchased and how new financing was accomplished. In these reports the reader will find interesting records of public relations policies, customer ownership, employee welfare work and safety first measures. Moreover, the company's plans for the coming year often are laid before the shareholders.

A few of these reports for the year ended Dec. 31, 1926, have already been reviewed in ELECTRIC RAILWAY JOURNAL and at least one will be abstracted in each week's issue for the next few months. From them many illuminating facts can be gleaned about electric railways operating in this country and abroad.

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Advertising Index—Alphabetical, 67; Classified, 62, 64, 67; Searchlight Section, 61

SAVING THE RAIL SAVES THE RAILWAY

# Now widely appreciated—

Comfortable, attractive, efficient cars have proved their value as traffic stimulators, but the idea that such cars alone are a cure-all is now widely appreciated. Almost every week some able railwayman records the opinion that cars, new or old, can be neither comfortable nor efficient unless operated on smooth, well-maintained track. We quote another—Mr. W. R. McRae, Supt. Rolling Stock and Shops, Toronto Transportation Commission:

"A smooth and well-maintained track is a most important factor in easy riding quality of the car and systematic maintenance and inspection are necessary."

It certainly seems logical to take the first step first—provide smooth comfortable track. It will make even your old cars ride better.

Here is equipment for economical rail grinding and welding.

*Bulletins?*
*Quotations?*
*Both?*

**Railway Track-work Co.**

3132-48 East Thompson Street, Philadelphia

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Chas. N. Wood Co., Boston
Electric Engineering & Mfg. Co., Pittsburgh
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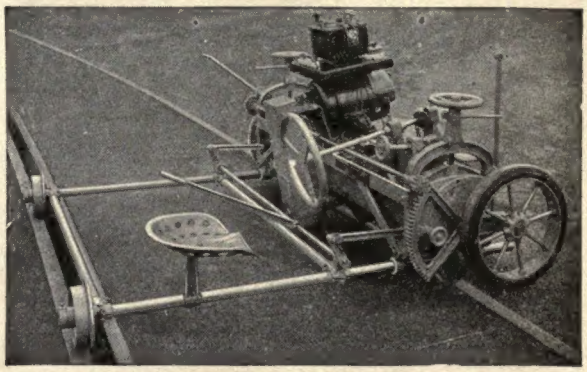
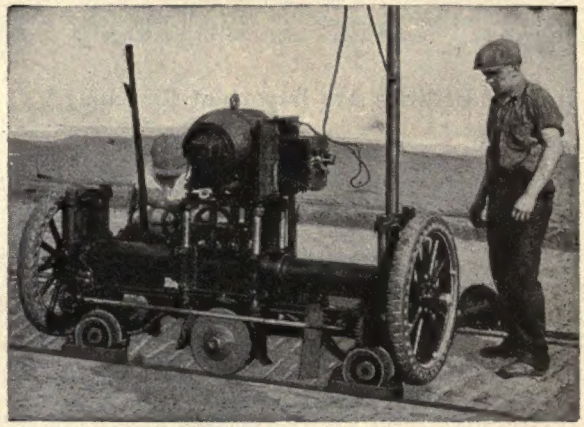
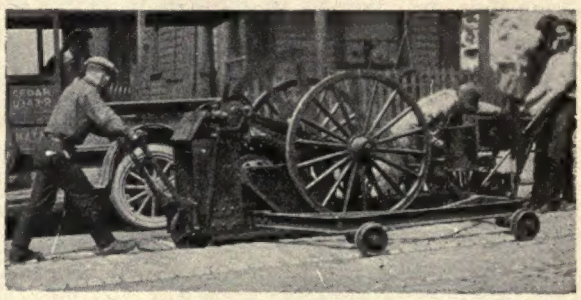


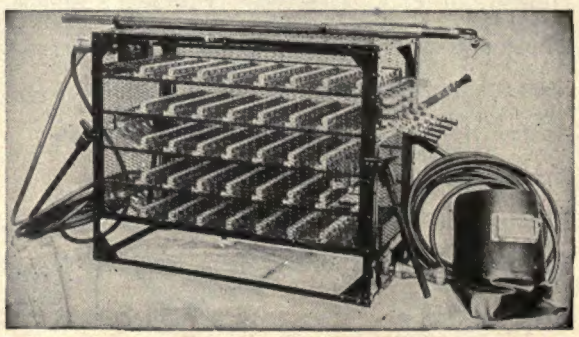
"Improved Atlas" Rail Grinder



"Imperial" Track Grinder



Reciprocating Track Grinder



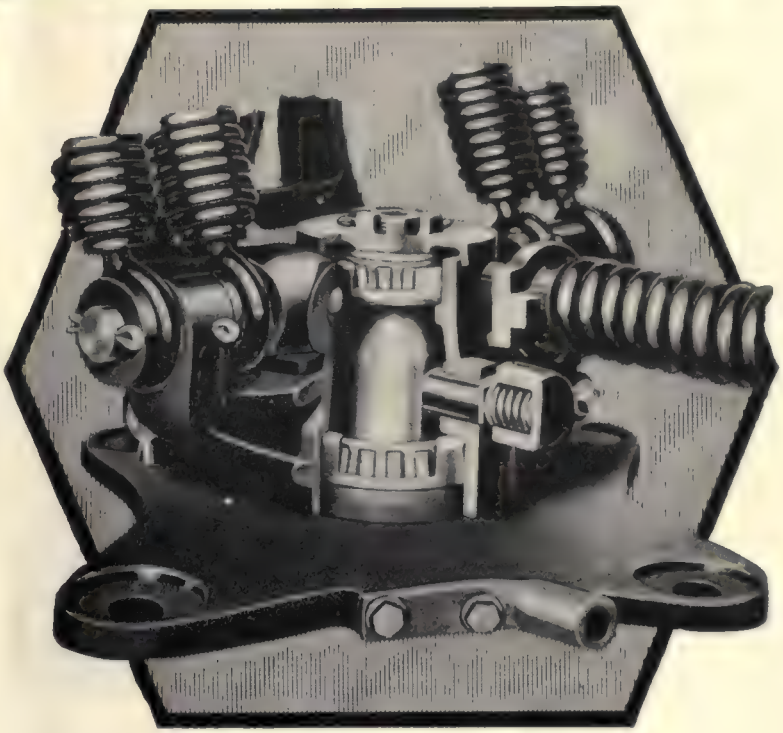
"Ajax" Electric Arc Welder

O.S.T.—1594

SAVING THE RAIL SAVES THE RAILWAY

Position when "hold down" latch is engaged, ready for changing of pole. Overall height 6½-in.

O-B assembly of Timken Bearings, and phosphor bronze contact for shunting the current.



Light, compact, and sturdy, the Form 4 Base is ideal for all classes of service.

# Floating on Timkens—

THE weight of the turret assembly, trolley pole, trolley wheel and harp, as well as the thrust load which results from the pressure of the trolley wire, is *floated* on Timkens.

This *floating principle*, which the O-B application of Timken Tapered Roller Bearings exemplifies, does more than distribute the load uniformly. It minimizes friction and wear, insures permanent alignment, gives you a trolley base that swings true and free indefinitely.

Nothing could be simpler, yet so completely effective. It is one of the features of the O-B Form 4 Trolley Base that has made possible new low records in cost of maintenance.

Packed in cup grease and fully protected against dirt and weather by the turret housing, the bearings are practically unaffected by length of service.

May we send you Folder 48C which explains this and other features in detail? Address

**Ohio Brass Company, Mansfield, Ohio**
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
330C

# Ohio Brass Co.

SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

# LONG LIFE

"OLD TIMERS" enjoy giving reasons for their long life. "Never touched tobacco," says one. "Smoked all my life," says another. The reasons are as varied as the individuals.

But for the long life without maintenance found in Davis "One-Wear" Steel Wheels there is a substantial reason.

A special composition, heat-treated steel gives the strength and wear resistance that makes long life possible.

Davis Wheels are "One-Wear" Wheels by reason of their own unusual physical qualities.

**AMERICAN STEEL FOUNDRIES**

NEW YORK CHICAGO ST. LOUIS

# How high is up?

*There was a time when people used to bait one another with such exploitation - We haven't heard whether the matter was ever settled.*

And in the electric railway field there has been considerable discussion on the matter of paved track construction—whether the construction should be *rigid* or *flexible*.

The controversial nature of the discussion of various types of paved track construction and the lack of comparative data has led to certain indefiniteness of statement — amounting, in some cases, to inaccuracy.

The engineers of the International Steel Tie Company have worked out a scale of comparison ranging from *extreme flexibility* (open track-wood tie) to *extreme rigidity* (slot construction—underground trolley) that will eliminate confusion of these terms.

The task of building the best paved track for electric railway use is only partly accomplished after the selection or designing of the tie. It remains to adapt the tie to the rest of the structure.

The adjustment of the tie to the rest of the track structure depends on factors often overlooked, i.e., the coefficient of expansion and contraction of *all* the materials entering into the structure—again the comparative normal life of those same materials.

This data is included in our new Paved Track Notebook. Engineers and executives should be sure to have this book—If you haven't received your copy, be sure to send for it.

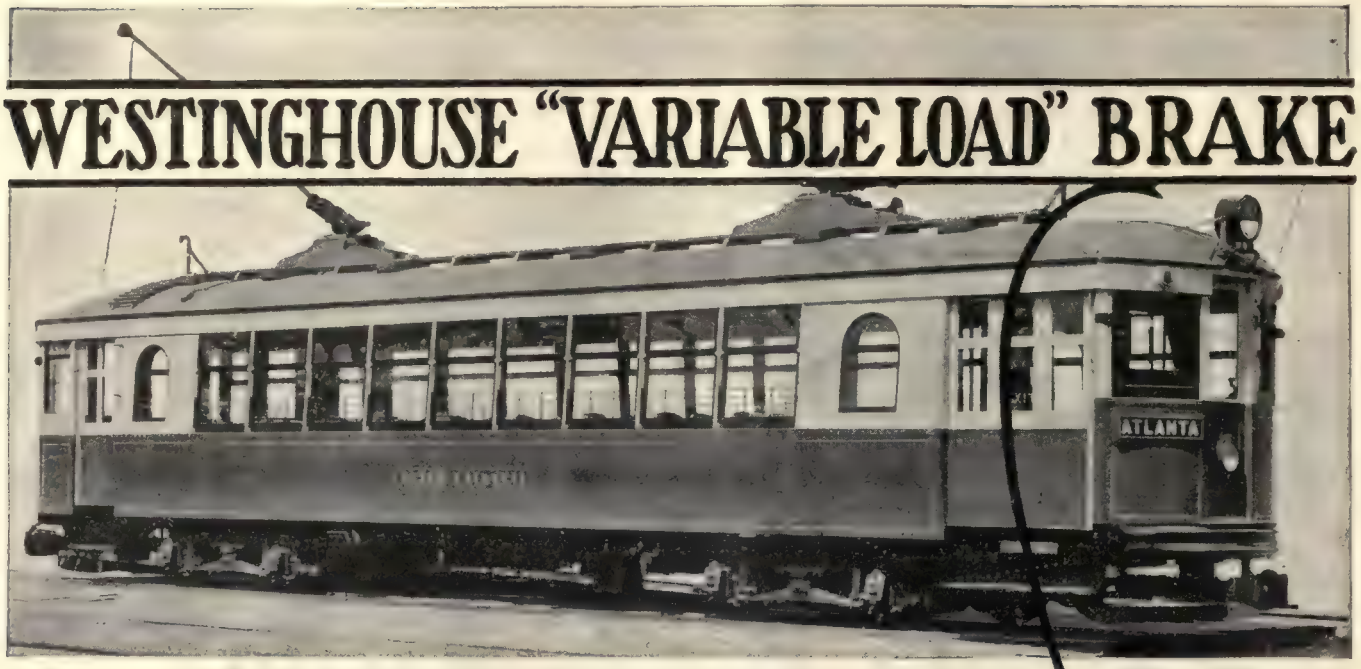
*The International Steel Tie Co.*

*Cleveland, Ohio*

20% more bearing surface

steel Twin Tie track

# WESTINGHOUSE "VARIABLE LOAD" BRAKE




## gives Uniform Braking with Varying Load

STABILIZED STOPABILITY throughout the entire range of car-loading means—

—safe and swift car movement, through congested districts;

—ability to hold traffic position with other moving vehicles, inasmuch as peak speed can be held longer between stops;

—a precise and systematic movement of shopping and business crowds;

—seconds saved, that may collectively be counted as dollars;

—stimulation of public good will, through a gratifying on schedule record over the entire system.

Many traction companies, recognizing the auspicious part Westinghouse Variable Load Brakes can play in effecting these far-reaching advantages, are specifying this new type equipment for their new modern light weight cars.

**Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office—**

***Ask for Descriptive Catalogue T-2045.***

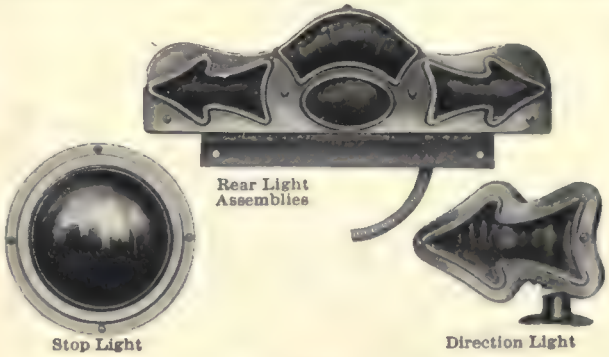
**Westinghouse Traction Brake Company**
**General Offices and Works: Wilmerding, Pa.**

# WESTINGHOUSE TRACTION BRAKES

*"Tell the public where you're going"*

## Hunter Illuminated Bus Signs

Made with roller curtains that permit ten or more destination names. Make easy the quick re-routing of buses. They advertise your service and establish your routes. Use them to "Tell the Public Where You're Going."




## Keystone Rear Lights

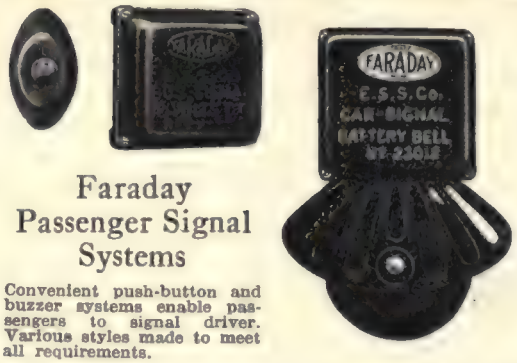
Well-designed stop lights, directional lights and complete rear light assemblies make for safer driving at night. They are an added protection for passengers and equipment.

Dome Type

Pendant Type

## Keystone-Ivanhoe Lighting Fixtures

Scientifically designed to provide ample and steady illumination in every part of the bus.




## Faraday Passenger Signal Systems

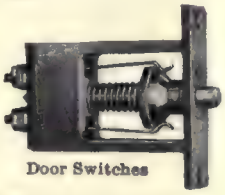
Convenient push-button and buzzer systems enable passengers to signal driver. Various styles made to meet all requirements.

## Faraday Signal System Accessories

Door switches are for indicating "open" or "closed" door and for operating step lights.

Conductors Signal Keys used on 2 man buses to signal driver. Other types for similar uses.

Conductor's Signal Switches


Door Switches

## Keystone Running Lights

Substantially made with cast aluminum body and lens retaining ring. Are water and dustproof.

Marker Light

Step Light

## Golden Glow Headlights

Designed to project powerful and well concentrated beams of light—yet they eliminate the glaring and dazzling effect by means of a greenish-yellow glass reflector which absorbs the blinding violet and blue rays. Reflector will never tarnish nor deteriorate. Adds safety to night travel.

ELECTRIC SERVICE SUPPLIES COMPANY

*Catalog No. 9 Send for your copy*

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# Safeguard and Accelerate Traffic

Automatic Signals by providing proper spacing of cars or trains, reduce trip time and enable more cars to be operated with consequent safety.

Interlocking installations at terminals and at grade crossings eliminate unnecessary stops and assure route continuity by means of signal indications.

Highway crossing protective devices of the flashing light, automatic flagman, or audible type, or combination of same, are a dependable insurance which soon pays off the investment.

Power operated remotely controlled switches are being used economically to accelerate Electric Railway traffic.

*These Systems are products of the*

**Union Switch & Signal Co.**

SWISSVALE, PA.

# P.R.T.

*buys*

200 MORE

YELLOW COACH

GAS ELECTRICS

# Mitten Management Never Guesses

Ag*ain* P.R.T. repeats on Yellow Coaches.

Ag*ain* P.R.T. reviews its experience with Yellows and expresses its confidence in Yellow Coach equipment by ordering 200 more—

100 Single Deck Gas Electrics
50 Double Deck Gas Electrics
50 Parlor Car Gas Electrics

# Four Times Has P.R.T. Made a Similar Decision

*Four times* has Mitten Management analyzed the performance of its Yellow Coaches from every possible operating and economy angle. And each time Yellow Coaches have furnished the only logical answer.

Originally P.R.T. bought 10 Yellow "Type Z" Double Deckers.

On December 20, 1924 they repeated with 125 "Type Z" Double Deckers, 75 Single Deck and 4 Parlor Cars of the Gas Electric type.

A*gain* a year later, more Yellow Coaches were ordered—25 "Type Z" Gas Electrics, purchased December 17, 1925.

Last February, when more equipment was needed, history repeated itself. Practical experience pointed to Yellow Coaches and *again* on February 15, 1926, P.R.T. bought 75 "Type Z" 6-cylinder Gas Electric Double Deckers and 62 "Type Z" Gas Electric Single Decks.

*and* NOW—

*200 More!*

Mitten Management, wherever it operates, knows by experience the value of Yellow Coach performance.

In Buffalo, also, orders for Yellow Coaches have been repeated again and again. For example:

The first order, December 30, 1925, was for 4 Yellow Gas Electric Parlor Coaches and 7 Gas Electric "Type Z" Single Decks.

*Again* 14 Gas Electric Single Deck "Type Z" Yellow Coaches were ordered on June 9, 1926.

AND NOW—

*24 More!*

14 Gas Electric Single Deck "Type Z" Yellow Coaches
10 Yellow Gas Electric Parlor Cars.

*Mitten Management Never Guesses.* It buys on the proved basis of past performance.

It buys *Yellow Coaches!*

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.

# "YOU PUSH THE BUTTON—"

PHYSICAL labor has no place in modern operation. In cars equipped with National Pneumatic Door and Step Controlling Mechanisms, the car man does not have to reach for or to struggle with door handles and door operating levers. He simply pushes a button and the National Pneumatic Engine does the rest.

NATIONAL PNEUMATIC COMPANY

*Executive Office:* 50 Church Street, New York

*General Works:* Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

# "Every bit of

*Harry Etheridge, Vice President and General Manager of the Harmony System. Mr. Etheridge is a keen analyst of electric traction problems.*

# vibration is removed"

"WE worked for ten years to perfect the system of track insulation you see here," said Mr. Harry Etheridge, Vice President and General Manager of the Harmony Railway System.

"Note the concrete blocks which support the rails. The natural tendency, you know, is for the rail to tip more to the inside than to the outside. For that reason the inside support of the cruciform tie is considerably longer than the outside one; that stabilizes the beam action and prevents the block from rocking.

"Now here's another very important feature —the shock absorbers on which the rails rest. A recess, ¾" deep, 5" wide, and 55" long, is cast in the top of each concrete block. In the bottom of this groove is a soft, resilient, asphaltic pad; on top of that is a harder pad of the same material. The rail is bolted over this cushion, so that it rests its entire length on a series of pad combinations. In this way every bit of vibration is removed from the concrete.

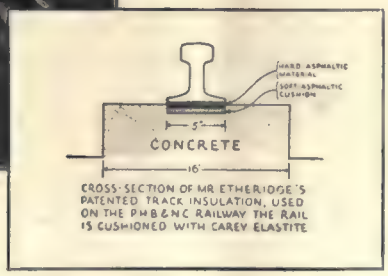
"An extra plate on the outside, where the rail sections join, carries wheel traffic over the gap without a jar. The tie rods, or bonds, serve a double purpose: mechanically, they hold the rails in gauge; electrically, they bond the rail joints."

*In view of the fact that ten years of investigation and experiment were needed to bring the track insulation system of the P. H. B. & N. C. Railway out of the experimental stages, Mr. Etheridge's extensive use of Carey materials is especially significant.*

*The cushions used in Mr. Etheridge's concrete blocks are of a composition similar to that used in Carey Elastite Track Insulation for paved track construction, now being used by some eighty-five railway systems.*

THE PHILIP CAREY COMPANY
*Lockland,* Cincinnati, Ohio

*View on the main line of the P. H. B. & N. C. Railway, at Ziegler Station, Pennsylvania, showing the interesting stages from the wooden cross-tie to the finished track insulation system. Note first the square concrete blocks, then the tie extended toward the center of the track, and finally the cruciform ties, shown in staggered rows in the perfected system.*




Carey Elastite
REG. U.S. PAT. OFF.
TRADE MARK REG'D. U.S. PATENT OFFICE

SYSTEM OF
TRACK INSULATION

Modern cars must be comfortable—smooth riding—quiet—economical.

The same adjectives can be applied to modern track!

Why should the industry spend millions for new cars with these qualities, only to have them neutralized by rough-riding, noisy track, which even constant maintenance can't make modern?

Thermit welding eliminates the maintenance of joints by eliminating the joints themselves. Thermit welding makes even old track ride more smoothly and quietly. Thermit welding provides a railway track which is fit for modern cars to run on—*permanently!*

And the first cost of Thermit Welding is the last cost—it lasts as long as the rail itself.

THERMIT

THERMIT

METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

# BALANCED DESIGN

## —and a new viewpoint on trucks - - - -

Competition has not been slow to develop the mechanical factors of passenger comfort. Speed, riding qualities, braking and silence have become powerful sales weapons.

Yet up till recently the design of electric railway trucks differed little from the conventional forms in use since the early days of the industry. Hard riding, noise, and inefficient brakes have formed a poor basis for ride merchandizing to a twentieth century public.

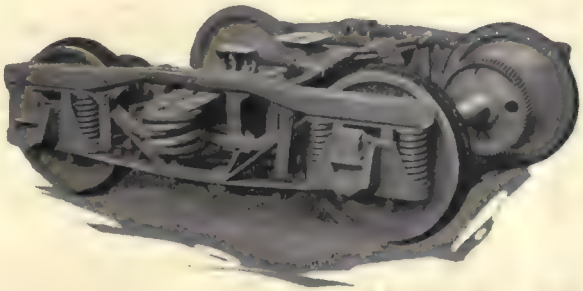
Realizing this, Cincinnati, in applying the principle of BALANCED DESIGN has made several radical improvements in truck design, notably in suspension, brake rigging and a practical application of the Duplex Air and Magnetic Brake. This may be only a first step, but it has resulted in Cincinnati NEW Lightweight cars showing substantial increases in schedule speed, with silence, freedom from sidesway and greatly improved riding qualities.

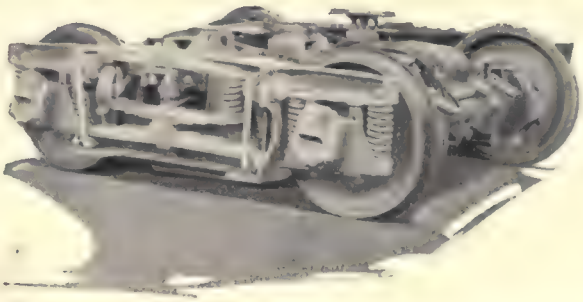
The facts and figures are ready for presentation to interested electric railway executives on request.

CINCINNATI CAR COMPANY
Cincinnati, Ohio

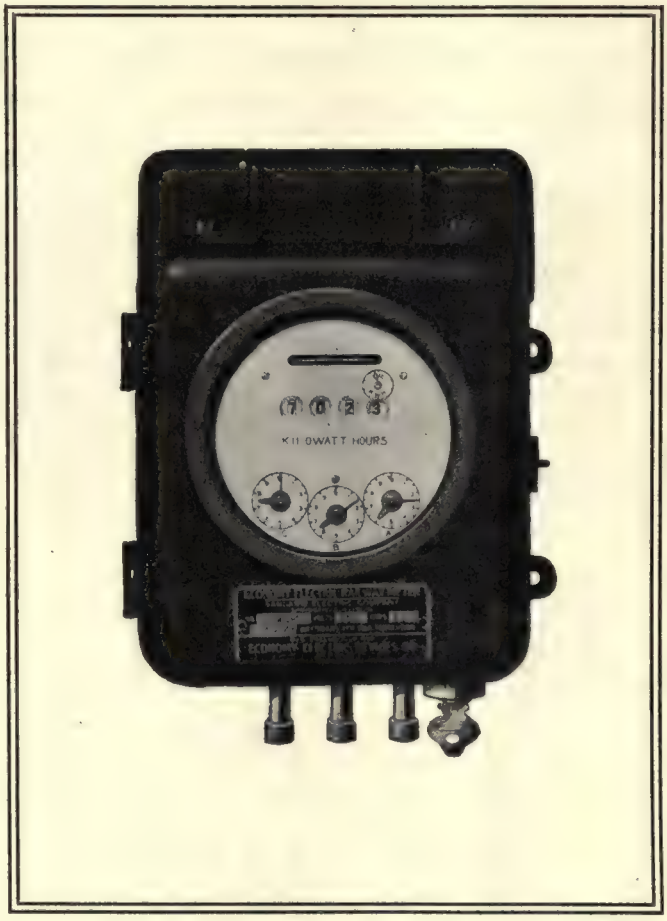
CINCINNATI *New* CARS

*A step ahead of the modern trend*





# PITTSBURGH ORDERS 1275

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*This is a rugged watt-hour meter. Top dials for motormen's power-saving records. Lower dials for car inspection use.*

*When the meter-driven hand on dial A reaches the marker set for this car at 6, the barnman knows that the brakes and controllers have done their work and are due for an inspection.*

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*After any inspection the meter-driven hand is set back to zero by means of its reset rod at the bottom of the case.*

*A lock prevent unauthorized resetting of inspection dials.*

*The Economy meter with inspection dials is readily adaptable to any electric car or locomotive operating condition.*

To Save Power At The Car
To Save Labor At The Car House

Metering The Energy—

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*Improves Car Operation*

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EVERY railway operator knows that friendly relations with the public may be made or broken by seemingly trivial incidents. A helping hand on the car platform—a courteous word—a comfortable seat—these and many other points of contact may make a warm friend.

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# GENERAL ELECTRIC

# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

**Published by McGraw-Hill Publishing Company, Inc.**

CHARLES GORDON, *Editor*

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## Prejudice Must Necessarily Recede Before Analysis

MUCH has been written in the last five years about the place of the bus in the field of transportation, but few men have been more specific about their ideas than was R. N. Graham, manager of railways of the Pennsylvania-Ohio Electric Company, in his paper before the Metropolitan Section of the Society of Automotive Engineers. The experience of Mr. Graham's company has extended to the fields of both urban and interurban service. He has viewed the bus with a sympathetic eye, but he has not allowed himself to become enamored of that vehicle to the extent that his admiration of it has been allowed to warp his judgment. To him there is very little that is tangible in the so-called rubber urge. This is not a theory with him. He has studied the matter at close range. Any choice between the two vehicles on the part of the passenger is simply one of greater convenience. His reflection about the rubber urge is worth pondering, namely, that inferences have been hastily drawn ascribing to this intangible element an influence which it never really wielded. Mind you, this is not derogatory of the bus! Neither was he derogatory of the bus when he said substantially that single-deck buses cannot be operated at a profit even under the most favorable conditions of traffic at the average city rate of fare for a distance greater than 3 miles.

No statement that Mr. Graham made shows better the impartiality with which the matter has been considered than the one to the effect that his company did not intend to operate a street car where a bus could be used more effectively; nor did it intend to operate a bus where the use of a street car produces a more satisfactory result in the service to the public and in financial results to his company. That certainly is specific. It is playing no favorites. The problem is an economic one, and Mr. Graham intends to keep it one so far as his ability goes to interpret events in terms of the best interests of his own company and the greatest convenience of his patrons.

So much was said by him that is significant that in writing about the matter the tendency of the reviewer becomes almost irresistible to repeat the axioms with which Mr. Graham's paper is replete. That, of course, would defeat the ends sought by comment such as this. To everybody everywhere interested in this matter the statement made by the author is significant that there is hardly a city in the United States of 150,000 population that could not well support a supplementary bus service at a 25-cent fare and that the demand for vehicles for this service would furnish a more stable market to the bus manufacturing companies than the attempt to force into mass transportation at standard rates of fare vehicles wholly impracticable to operate from a standpoint of profit.

As for electric railway men, what could be more significant to them than that the company at Youngstown is now operating nearly as many buses as street cars and as a result the railway situation has been improved and bus operation made self-sustaining! Was ever stronger vindication offered of the policy of coordination and not of substitution? In that they were very specific Mr. Graham's remarks should tend to preserve a sense of proportion as regards the places of the two vehicles. His statements about the street car and the bus were not iconoclastic of either of these vehicles. The answer to the question of the use of these vehicles is to be found more in analysis and less in prejudice. The farther the first of these practices is carried the more will the other be compelled to recede.

## Where Angels Fear to Tread

UNFORTUNATELY, in most large cities, the individual is not permitted to select his transportation service to fit his particular desires and pocketbook. Transportation companies have been forced to develop within narrow limits as to character of service and price. They have not been permitted to provide a different grade of service for the man who is willing to pay more for additional comfort and luxury.

This is not directly attributable to any deficiency on the part of transportation companies. The responsibility lies primarily on the shoulders of those who have exercised regulatory authority over them. And because low-priced transportation service has proved an effective issue on which to ride into office, politicians have too often forced a low-priced, low-grade service (in terms of comfort) whether or not we were willing to pay for more.

The only other choice in local transportation is the private automobile or the taxicab, but the cost for such individual service jumps to five or ten times that of the common carrier. Although the bus afforded an excellent new agency with which to build a new character of service at an entirely different level of rates, and was unrestricted by precedents, its proponents have not always risen to their opportunity. Most of those interested in the development of buses are busy making them into street cars on rubber tires at street car rates, so that the man who is willing to pay more for greater comfort in his daily transportation still has little choice outside the taxicab or private vehicle.

As Mr. Graham has indicated full advantage has not been taken of the opportunity to develop a distinct character of common-carrier service at a level of rates ample to permit a substantially higher grade of transportation service to be rendered. Already in New York, where the scramble for bus franchises pitted a large number of eager bidders against each other, the 5-cent piece has

been permitted to become in the popular mind the unit for measuring bus fares. Despite the fact that this bit of political bait which has sufficed to distract the attention of the long-suffering riding public over many years has so starved the existing transportation companies as to make their so-called valuable perpetual franchises mere obligations to render service at a loss, there are apparently many bus optimists who are anxious to rush into an obligation to run buses at street car rates on the bland assumption that a franchise to conduct a service at a loss is worth a lot of money. Of course, there can be no particular quarrel with those who are willing to put up their money under such conditions, but in the fact that these promoters are dragging the bus down to the level of the sadly starved New York street car they are establishing precedents for the bus that will be difficult to overcome in the future.

## Marking the Price on the Package Does Not Guarantee Its Worth

CRITICISM of the present popular practice of issuing no-par-value stock is one of a number of interesting points emphasized by Prof. William Z. Ripley in his recent writings on various phases of corporate financing. Like most generalizations, his comment fails to fit in many instances. So far as electric railways are concerned, his criticism seems to have little application, and the arguments in favor of no-par-value stock appear to be at least as strong as those against it.

Briefly stated, Professor Ripley's objection is that the issue of stock without par value makes it difficult to determine how much money actually has been invested in the property and hence to some extent shrouds in obscurity the financial status of the company. In the case of a utility under the jurisdiction of a regulatory commission, there are two groups which have a legitimate interest in its financial affairs—its security holders and its customers. It is difficult to see how either group would benefit greatly by the establishment of a par value for every share of stock.

No fixed relation exists between the actual value and the par value of any stock. The actual value is determined by the equity behind the stock and by its potential earning power. Frequently, earnings are plowed back into the property, thereby increasing the value of the stock far above what it was originally. Many electric railways at times when it was deemed inexpedient to issue securities have financed improvements out of earnings. To those not in a position to know all the details of the company's affairs, the establishment of a definite par value for its stock may easily be more misleading than informative. Records are always available, however, to show the capital expenditures that go into a property. In these records lies the stockholders' best protection.

The customer's interest in the financial affairs of a utility concerns only their effect upon rates. At present, rate determination depends almost universally upon a valuation which is entirely independent of the face value of outstanding securities. A reasonable return is allowed on the so-called "actual value" of the property. Par, therefore, means nothing to the customer. His interest is protected by a regulatory commission. Under these circumstances the value of the stock may well be left for determination to the law of supply and demand.

## South Shore Line a Trail Blazer

IN ITS revolutionary step of placing in service all-steel, six-truck, parlor-observation and dining cars, the Chicago, South Shore & South Bend Railroad has delivered a smashing blow to competition as well as to a case-hardened precedent of the industry—the practice of false economy.

In the latter case, such service aligns the South Shore with those trail blazers in the field who long have realized that men and fashions change, that today comforts are not considered luxuries as they were ten years ago. To prove this assertion, one has only to walk through any of the steam railroad express trains. Gone are the lunch boxes and crowded day coaches. From every walk of life can be counted those who are availing themselves of the creature comforts afforded by de luxe service. With the economic upheaval incident to the World War has come a demand for a better class of traveling facilities. What was good enough for father is not good enough for son. The people are willing to pay for better service, and if the electric railways will not supply it, then they will seek that form of travel commensurate with a new social status.

While not all public utilities can afford the refinements of the South Shore, they can, nevertheless, follow its example in proportion to their means. Clean cars, paint, courteous service, a few little appeals to the new tastes of passengers, and informative publicity will, in proportion, place the little fellows of the industry in the front rank of trail blazers.

Progress today is a huge juggernaut that pursues us relentlessly. If we hold to the old fanatical precedent, then sooner or later, like the Indian ascetic, we will be mashed flat. Such adherence to hidebound precedent is a beautiful gesture with a meaningless purpose. It is creating a lot of industrial morons.

## Temper Your Tools Before You Cut

SINCE public relations, as the name implies, covers all phases of a company's dealings with its public, no possible element of contact should be slighted. Least of all should those in charge of a railway's destinies discount the important rôle which the platform men may play in stimulating that somewhat intangible, but none the less essential, asset of good will.

Should a surgeon exercise the greatest diligence in preparing his instruments for use in an operation, sterilizing them with minute attention, and then fail to give equal attention to the hands which will guide those instruments, he would fall far short of his duty. And the conductors and motormen are the very hands of the railway. It is they who come daily in personal contact with the passengers. The public relations department may talk till it is literally blue in the face; it can publish house organs and lay out advertising campaigns which will indicate beyond peradventure that the company's first and primary consideration is the welfare of its passengers. But the yardstick by which Mr. Average Man measures the railway and its service is simply the attitude of the rank and file employees toward him. This is of course assuming that the company is playing fairly with its patrons and is endeavoring to give frequent and comfortable service.

Complaints of discourtesy, of personal shortcomings of individual employees, are most difficult of all to handle satisfactorily. With a complaint of inadequate service in a certain section of a community it is possible to determine specifically whether the requested improvements are feasible. Service complaints may be reduced to more or less simple considerations of profit and loss. But not so with the personal factor. It is difficult to obtain fair and incontrovertible proof of an employee's culpability. The unsubstantiated word of the complaining passenger cannot always be accepted. Possibly the patron deliberately set out to stir the animus of the employee and is endeavoring to wreak his vengeance upon the individual for real or fancied grievances against the company.

But it may safely be asserted that where the total of personnel complaints on a given property is exceptionally high there is some fire to justify all of the smoke. The direct dealings of an established public relations department with the public are essential and worthy of careful attention. But the best way of reaching the passengers is not through the newspaper columns or over the radio. It is simply through the smile on the face of Conductor Brown or Motorman Jones. There is no use in theorizing with the men. Show them specific instances in which they can establish themselves in the eyes of their passengers as transportation salesmen. They are not blind to the importance of their own jobs, but they need thorough enlightenment on the important subject of public relations. They must be shown the how and the wherefore of adopting merchandising principles in the collection of fares and the operation of street cars. Let the individual once feel his personal responsibility for the success of the public relations campaign that his company is making and half the battle is won.

## New Money for a Regulated Utility Is in Competition with Industry

DISTINGUISHED from a manufacturing establishment, the utility is supposedly non-competitive. This condition is only partly true, but because of it the utility is hedged in with many laws and regulations intended to limit its earnings and to control its financing. This control is either by public service commissions which establish the status of utilities from time to time as operating or economic conditions dictate, or by service-at-cost franchise in which the rates and the rate bases is determined once for all in advance.

Frequently it is overlooked that two streams of money must be continually flowing into a utility property serving a growing community. One stream, in the form of revenues derived from the sale of service, must pay all of the operating costs, the maintenance of the physical equipment, interest on borrowed capital and a profit to the owners. The second stream is the new capital that is necessary to keep the property abreast of the times, to build extensions and make possible service to new customers. The utility, therefore, must for this reason frequently go into the open market to borrow money. To be successful it must pay the market price and must meet the market conditions of the moment. If not free to do so new money will be diverted to other channels and the company cannot properly grow to serve its public.

While many complex financial situations may arise in the operation of utilities, at the base of them all is this situation that the utility, no matter how it is regulated, is in competition with all industry in the search for new funds. It is one thing for a regulatory body to limit earnings on money already obtained, but it is quite another to hold them so low that investors cannot be induced to supply the capital necessary for expansion. A commission may control the fare charged and the rate of net earnings that may be allowed. It cannot, however, force the investor to put his money in an enterprise where there is little hope of profit and no guarantee of ultimate safety of principal. For this reason, the condition of the money market must be an ever-present factor in the regulation of earnings.

## Twin Cities Confident of the Results of Co-ordination

NOT the least important of the statements contained in the annual report of the Twin City Rapid Transit Company is the expression of confidence on the part of the management that the services of the company can be successfully co-ordinated. This is particularly significant because co-ordination there contemplates the welding together of electric railway, bus and taxicab services on a scale of no mean proportions in its contemplation of the use of the bus and the taxi. The net earnings of the buses for the year 1926 were small, but the explanation given is that complete control of the bus lines was not acquired until the early part of 1926. Time is the element needed to consolidate operations on an efficient basis. With the start well made on that program, the management is satisfied that the bus properties will earn a much larger return during 1927. As for the acquisition of the taxicabs, their ownership has been a matter of only a few weeks duration. About them, too, the management is optimistic. It feels that the unification of the competitive cab companies will materially improve public transportation by reducing congestion. Certainly that end would not be achieved under competition.

These things are in the future. As for the past, the company closed 1926 with a net income of $1,436,805 transferred to profit and loss compared with $1,037,427 for the previous year. In addition to the dividends on the preferred stock it paid four quarterly dividends of 1¼ per cent on the common stock, or 1 per cent more than was paid during 1925. Gross revenue was up about $1,500,000 and the recession in passengers carried was inconsequential compared with the grand total carried the year before. Some kinks still remain to be ironed out under the settlement plan which governs the terms under which the company is now operating in St. Paul and Minneapolis, but the progress made indicates that the cities and the company face a future auspicious for both of them. This statement is perhaps subject to the reservation that nothing comes of the so-called Brooks-Coleman legislation, now pending in Minnesota. The case against that legislation is very strong. Repeal of the state regulatory act, contemplated by this measure, would, to say the least, destroy much of the effect of the recent harmonious moves in the Twin Cities. That is not a prospect which the people of these cities can contemplate with equanimity.

# $3,500,000 for Expansion of Transportation Facilities in San Francisco

Because of the steep grade in the adjacent street, this car line was diverted through the edge of the park where a cut was possible. It is proposed to extend this route 2.73 miles, partly on private right-of-way, similar to that shown here, and partly through paved streets.

*By M. M. O'Shaughnessy*

City Engineer San Francisco, Cal.

**Municipal Railway Will Open New Ocean View Line This Summer—Track Extensions Totaling 11.6 Route-Miles Are Planned—47 Additional Cars and 26 Buses Will Be Bought**

RECENT improvements made by the Municipal Railway of San Francisco and new projects planned for the near future involve extensive changes in the local transportation system of that city and surrounding territory. A new car line to serve the Ocean View district will be opened this summer. The Duboce tunnel, an undertaking similar to the famous Twin Peaks tunnel, will be completed in the latter part of this year or early in 1928. A four-track addition is being made to the Mariposa Street carhouse. New shops and garage facilities are planned. Track extensions of considerable length are contemplated and much additional rolling stock will be bought. These improvements are to be financed by a bond issue of $3,500,000.

At present the railway operates 188 double-truck and 21 single-truck passenger cars on about 70 miles of track. It is planned to add 47 double-truck cars. The majority of the present cars are of the California type, 47 ft. 1 in. long and 9 ft. 2 in. wide with seating capacity for 54 passengers. The average weight is 50,000 lb. They are of semi-steel construction and on account of the severe grades are equipped with four 60-hp. or 65-hp. motors per car. In the near future 26 new buses will be added to the thirteen now in operation. Thus the next year will see a substantial expansion in the transportation system which originated fourteen years ago through the taking over of the Geary Street cable line from the Park & Ocean Railway, whose franchise had expired.

At that time the cable construction was torn up and the old road was converted into an electric line, with extensions reaching west to the ocean and east to the ferries. The first section of this line was placed in service in December, 1912, and in June, 1913, the balance of the Geary Street line was placed in commission with 15.08 miles of single track, together with 1.10 miles of sidings and turnouts.

To handle the traffic to the Panama-Pacific International Exposition, held in 1915, a bond issue of $3,500,000 was voted in 1913. The line of the Presidio & Ferries Railroad, whose franchise had expired, was acquired in December of that year, and in less than twelve

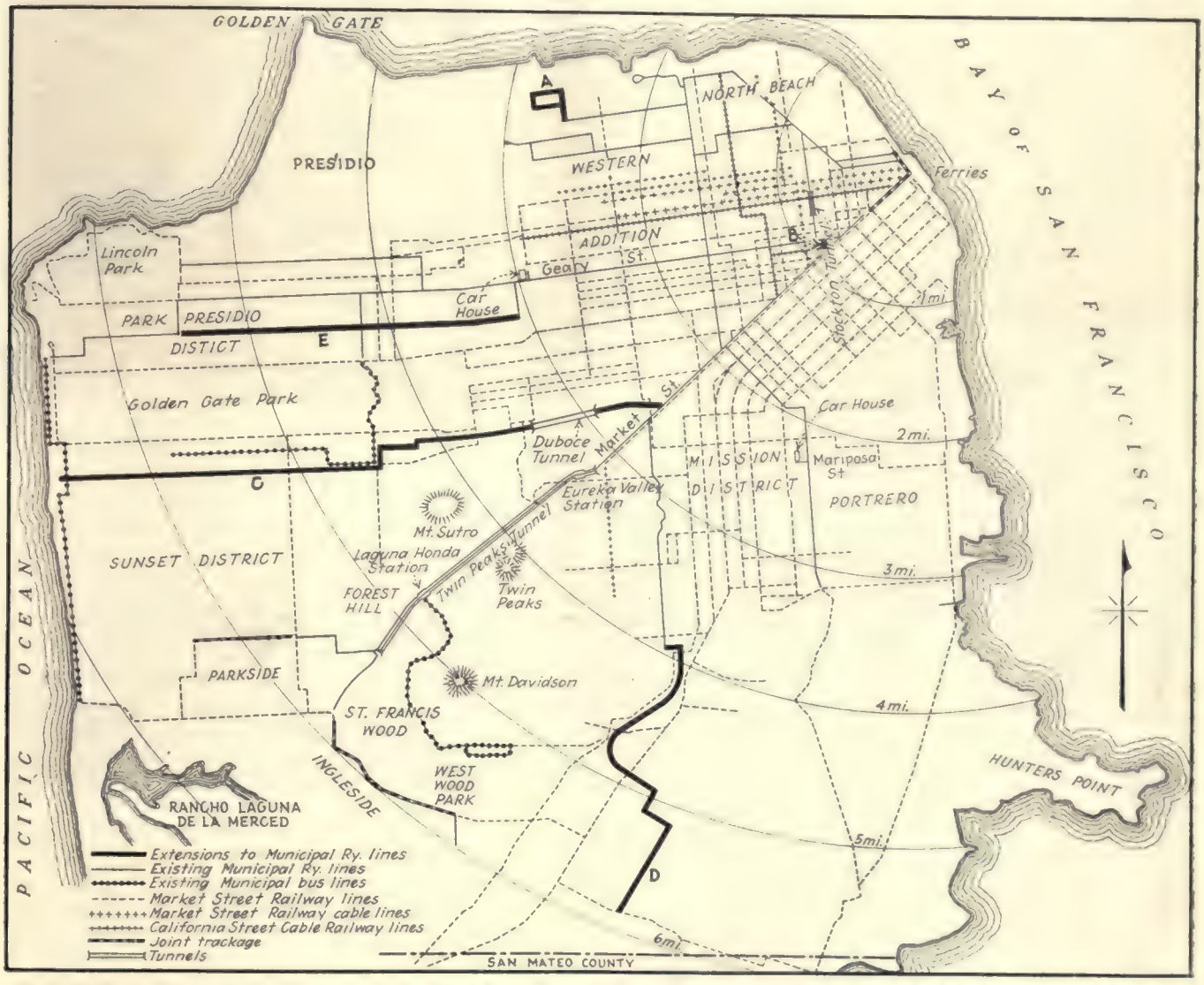
Type of Station Used at Intermediate Points of Tunnel. Elevators Lower the Passengers to the Train Level

months from the time of voting the bond issue new lines, constructed from these funds, were placed in commission.

In general, the policy of planning new lines has been to supplement the privately owned system of the Market Street Railway by building only where the new routes would serve territory not otherwise taken care of. Only such competitive lines have been built as were considered necessary to make the municipal system an operating entity. Thought has been given to the trackage necessary for a unified system, combining both privately owned and municipally owned lines. This is the ultimate end in view as it is believed that only through the unification of transportation facilities can maximum service be secured.

San Francisco is a city of hills and these have had a marked influence on the layout of the street car lines. The cable railway was first developed here and to this day a considerable number of routes must be operated by cable in order to negotiate the grades. These lines are slow and inflexible as to routing. It is impossible to replace them by trolley lines without making detours or resorting to expensive private rights-of-way, neither of which will give direct service as do the cable lines.

To provide access to some of the desirable residential property lying on the remote side of the hills from the main business district it has been necessary to drive two tunnels through intervening ridges and the construction of a third is now in progress. The shortest of these is the Stockton Street tunnel, approximately 900 ft. long, which leads from the main business section to the North Beach district. This was completed and used in connection with the 1915 exposition. In 1918 the Twin Peaks tunnel was opened. This is exclusively rapid transit, 12,000 ft. long, 25 ft. wide and 18 ft. high, providing a high-class residential territory with transportation many minutes faster than it had previously.




**Track Extensions Totaling 11.6 Miles of Route Will Substantially Augment Transportation Facilities in San Francisco. (A) Marina Track Extension, (B) Downtown Loop Connection, (C) Duboce-Sunset Extension, (D) Excelsior District Extension, (E) Balboa Street Extension**

The Duboce tunnel, now being built, has the same cross-section as the Twin Peaks tunnel. Through it a new line to the Sunset District will be operated. This tunnel has a length of 4,200 ft. and will be placed in commission late in 1927 or early in 1928. All of these tunnel projects have been paid for by assessments levied on the property directly benefited.

Grading for the extension of the railway into the Ocean View district, running from St. Francis Circle through the Merced Rancho lands, was completed about a year ago. It was necessary to make two large earthfills across gulches which, on account of the dryness of the season, were expected to settle. This made it in-

advisable to lay track at once. Experience during the past wet season showed the wisdom of this delay. Trolley poles, wires and feeder cables have already been erected and contracts recently were awarded for the track laying. This will be completed during the coming summer.

Several track extension projects are planned for the near future. The area once occupied by the Panama-Pacific exposition has been subdivided, streets have been paved, sewers built and 200 houses are now being constructed. The whole district is being settled very rapidly, but is without adequate transportation, although the Municipal Railway is adjacent to it on two sides. It is proposed to construct 0.69 mile of new route to serve this area. By the construction of 1.9 miles of new track a downtown loop can be built to relieve congestion at the ferries and provide an emergency route in case of a blockade on Market Street. Completion of the Duboce tunnel already referred to will necessitate the construction of 4.54 miles of new double track from Market Street to the beach. At present a large territory known as the Excelsior district is without any transportation. It is proposed to extend the Church Street line via private right-of-way and existing streets to a point near Geneva Avenue, a total distance of 2.73 miles. Between Fulton and Geary Streets is an area approximately 2,640 ft. wide without transportation facilities. The growth of this district during the past few years has been phenomenal. Proper handling of the traffic necessitates the construction of 2.79 miles of double track on Balboa Street, roughly bisecting the unserved area. In all, these projects total 10.94 route-miles and would cost $1,395,000 for track construction. A summary of the mileage and cost is given in an accompanying table. Their locations in relation to the transportation system as a whole are shown on a map on another page. Other short additions bring the total of proposed new routes to approximately 11.6 miles.

**Carhouse Facilities of the Municipal Railway of San Francisco**

At top—New inspection and storage tracks recently constructed on the upper level of the Mariposa Street carhouse.

Center View—Carhouses of the Municipal Railway of San Francisco are designed to permit entrance at different levels from two streets. This shows the front entrance of the Geary Street carhouse.

At left—Recent improvements at the Mariposa Street carhouse include a recreation room for employees.

Proposed extensions of bus operations involve five new routes and 7.67 route-miles. Details concerning the bus operation of the Municipal Railway will be given in an article to appear in a future issue of ELECTRIC RAILWAY JOURNAL.

At present two steel and concrete carhouses are in use in different sections of the city. The sites were selected with a view to double-decking, cars going into the lower level from one street and onto the upper level

SUMMARY OF RAILWAY PROJECTS

| | | Route-Miles | Cost of Track |
|---|---|---|---|
| A | Marina tract | 0.69 | $60,000 |
| B | Downtown loop | 0.19 | 70,000 |
| C | Duboce-Sunset | 4.54 | 567,000 |
| D | Excelsior district | 2.73 | 343,000 |
| E | Balboa Street | 2.79 | 355,000 |
| | Total | 10.94 | $1,395,000 |

Entrance to Stockton Street Tunnel. The Duboce Tunnel, Which It Is Hoped to Complete by the End of the Present Year, Is Similar in Purpose Although Considerably Longer

from another street at a higher elevation. The Geary Street carhouse will accommodate 120 cars and that at 17th and Mariposa Streets 140 cars. During the past year a second story was added to the carhouse at the latter location. This does not cover the entire area of the lower story, but provides four extra storage tracks with inspection pits, giving an added capacity of 32 cars. Offices for the assistant superintendent, dispatcher, inspectors and cashier, as well as a waiting room, recreation room and reading room, have been provided.

Provisions were made in the original Geary Street carhouse for a small repair shop to take care of the 43 cars then owned. The Municipal Railway now has 213 cars, thirteen buses and other equipment which must be maintained. No addition has been made to the original shop space and it has now become impossible to keep up with the work to be done. An appropriation of $250,000 is desired for the construction of a modern car maintenance and repair plant.

## Subway Building Filmed

CONSTRUCTION work on the Eighth Avenue subway system in New York City is shown in motion picture film recently released by E. I. du Pont de Nemours & Company of Wilmington, Del. This film, which is entitled "Building New York's Newest Subway," is printed on safety stock, is one reel in length and requires fifteen minutes for showing.

The film is a veritable trip along the line of activities, as it shows not only scenes underground where great ledges of rock are being blasted away in the tunnels but also work in the open trenches and cuts. How windows are safeguarded from vibration caused by blasting, how monuments are propped up and how telephone and electric cables are kept in operation are pictured in the reel, as are the great tools used in the work, such as telphers, caterpillar shovels, powerful trucks and steam hoists. Scenes showing how explosives are used and stored on the job are interesting features. Other views show partially finished sections where the steel framework is in place.

This film may be obtained upon application to the publicity bureau of E. I. du Pont de Nemours & Company of Wilmington, Del.

# Vienna Slowly Recuperating

### Statistics of Traffic During Last 21 Years Show Many Fluctuations and Recent Large Increase in Passengers—Flat Fare Now Used

LOCAL transit conditions in Vienna during the past 21 years are treated in an interesting review in a recent issue of *Verkehrstechnik* by Dr. A. Winter of the Vienna Municipal Railway System. The period covers nine years prior to the outbreak of the war, five war years and seven post-war years. The means of communication in Vienna are an extended surface railway system, an elevated and subway rapid transit system and buses. All of these are now owned and operated by the city.

With a population of 1,800,000, Vienna has today about as many inhabitants as it had in 1905. The steady growth of population in pre-war years reached a maximum of 2,200,000 at about the beginning of the war at the end of 1914. During the war the figure fluctuated, but by its close a heavy decline had set in. Since 1920 the city has recuperated slowly in population. Fully dependable statistical investigations carried on for many years past disclose the notable fact that within recent years the total number of rides on public vehicles has been constantly growing. In spite of the greatly decreased number of inhabitants, the average number of daily rides on trolleys and rapid transit systems is today about the same as it would have been had the old ratio been maintained and the city grown steadily at the rate of pre-war years.

Various factors are responsible for this rather paradoxical development. The chief reason is the gradual shifting of the center of population away from the business center, so that people have longer distances to cover to get to and from their work.

Up to 1916 Vienna used the zone fare system with three graded fares. In that year, owing to the rapid increase in the number of maximum fares, as compared with the two lower rates, the lowest fare was dropped. This left only two rates, and in 1921 one unit fare was adopted for all rides.

The average distance traveled per passenger per ride grew gradually but constantly from slightly over 4 km. (2½ miles) in 1908 to 5.6 km. (3½ miles) in 1926. Like most metropolitan cities, Vienna has shown during the last twenty years a decided "city formation"; that is to say, the center of the population is moving more and more away from the inner part of the city, which is the business district.

During the war years a very large increase in business was done by the surface lines, the peak being reached in 1918. The reasons were the enormous devaluation of money, the greatly increased number of male and female workers in war industries and the large number of business people and soldiers called to Vienna, as the war center of Austria. During the following year, 1918 to 1919, a decline set in, more violent than the previous rise, caused by restrictions of operation due to scarcity of coal and cars, and the general poverty of the people. During 1920 and 1921 a distinct improvement in traffic was again recorded. This was again followed by the deflation panic of 1922, when the lowest point was reached. Money became next to valueless, causing the cost of living, expressed in this money, to soar to unheard of values. Families depending upon a fixed income, like annuities, had great financial difficulties, but wages and salaries were raised as the value of the currency declined. During this period the trolley system carried practically all of the

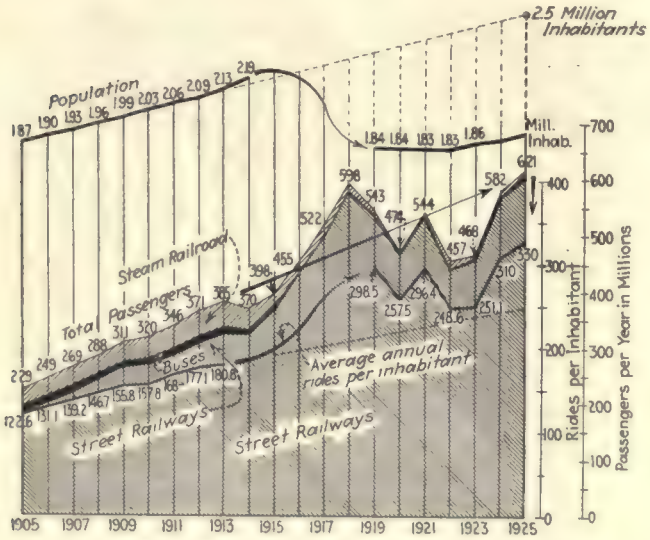



Chart Showing Data of Vienna Local Transit

traffic, as bus lines and entire sections of the rapid transit system had to suspend operation.

Conditions began to improve at the end of 1922, showing immediately a rise in traffic again. Another factor in favor of increased trolley riding was the exceedingly acute scarcity of living quarters. Building had practically stopped since 1915, and while it was previously customary for the workman to move nearer to his new place of employment when he changed his job, he had to stay now where he lived, regardless of how far he had to travel to his new place of work. A large army of workmen is thus being transported daily by the trolleys between their homes and their factories. More than 80,000 persons are at present seeking more con-

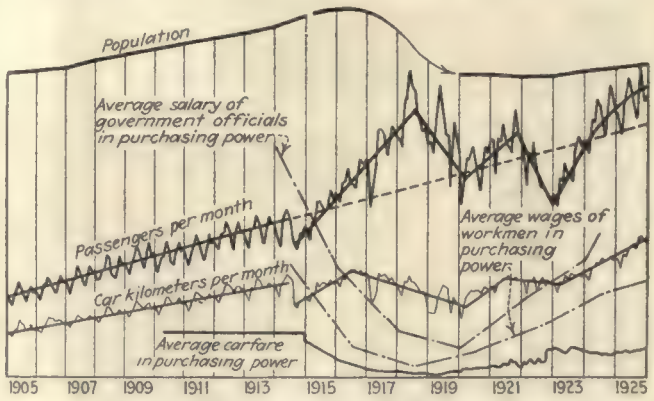



Chart Showing Purchasing Power of Wages and Other Data Affecting Riding in Vienna

venient living quarters. An extensive building program, covering the erection of 25,000 houses for some 100,000 people, is now in progress. The houses are being built in blocks, scattered over the entire area of Vienna.

Another and very important impetus to more frequent riding on public conveyances was given by the electrification of the Stadtbahn (elevated and subway line) in 1925, with the same ticket valid on all rail lines, both trolley and rapid transit. With the greater speed and comfort on the new electric trains the passenger traffic on the Stadtbahn more than doubled. At present 270,000 passengers are carried daily. During morning rush hours (if this expression can be used for Viennese traffic), between 7 and 8 a.m., an average of 22,000 passengers are transported.

On pleasant Sundays and holidays in the summer as many as 60,000 persons have been carried during a four-hour afternoon period. A noticeable addition to the number of public carriers is contributed by motor buses, which operate radially from the center of the city to the outer trolley lines.

A final impetus to travel which should be included is no doubt the very low unit fare, which is only 80 per cent of the pre-war average fare. This percentage corresponds to two-thirds of the purchasing power of the fare in 1914. For this reason a further increase in passenger traffic may be expected.

## Indiana Utilities Important Revenue Producers

SEVENTEEN per cent of the taxes collected in Indiana are paid by public utility companies, Fred A. Sims, formerly chairman of the Indiana tax board, recently told classes in public utilities and public utility law at the School of Commerce at Indiana University. He said that the importance of these properties as revenue producers might be illustrated by the fact that in 1924 they represented 12.88 per cent, while in 1926 they represented more than 17 per cent of the total value of property for taxation in the state.

One of the fare zone limit signs along the route. This view shows the type of concrete highway over which the coaches run and the character of much of the territory.

# Interurban Service Offers Broad Field for the Bus

*By R. N. Graham*

Manager of Railways Pennsylvania-Ohio Electric Company

**Electric Railways Have Never Covered the Field that Exists for Transportation Outside the Cities, and Today Buses Are Able to Handle a Great Share of This Business—Operating Refinements Overlooked in Bus Design Should Be Given Attention**

IN THE field of suburban and interurban service there is a tremendously great future for the motor bus. Here we are no longer limited by a flat fare. Every ride is a zone ride. The territory where interurban street railways were never built is vastly greater than the unfilled field in city operation. Since the ratio of initial investment to the number of passengers carried is so much less in the case of the bus than the street car, it is possible to operate bus lines where under no conditions was it possible to operate any form of transportation requiring a fixed investment in way structures.

Thus the communities without adequate public transportation connection with other communities which are either natural markets, sources of supplies or in which there are other community interests are rapidly being connected with motor bus lines.

Where interurban railways have already been built the bus can be used by such properties in an intensive development of their territory such as was never possible without the bus. On our own property prior to 1922 we operated approximately 60 route-miles of interurban and suburban railway. We are now operating nearly 400 route-miles of coaches. The comparison of our present interurban operation with coaches and street cars is as shown in the accompanying table.

The number of coaches and street cars shown in this table is the number required for regular runs. We own 29 modern interurban cars and 43 interurban coaches. Parallel to our interurban lines the coach service is a high-class express service operated at a higher rate than the electric cars, which carry heavy industrial loads that could not easily be handled by the smaller capacity coaches. The connections of Youngstown with Cleveland, with Akron and with Meadville are natural transportation routes which it would not have been possible to establish by building interurban railways in recent years. It is thus apparent that the use of the motor bus has enabled us to give not only a more comprehensive service to points where our rail lines already operated, but has enabled us considerably to extend our service to the public.

On our main interurban coach lines we maintain complete and adequate terminal facilities in the larger cities. In cities such as Cleveland, Youngstown and Akron to maintain a modern waiting room in the heart of the city represents a great expense, but we feel that we cannot offer our fa-

THIS is the second article based on an address before the Metropolitan Section, Society of Automotive Engineers, by Mr. Graham in New York on Feb. 17. The first article, which covered the place of the motor bus in urban transportation, was published in last week's issue of ELECTRIC RAILWAY JOURNAL. Mr. Graham has taken up the field for interurban bus operation and also points out to manufacturers some of the features of bus design which cause difficulty in operation.

cilities to the public as a real service without extending all necessary conveniences to it in its use of our service. In all the towns through which we go we also maintain depot arrangements. Our routes are marked with zone markers, and stations, both in the great cities and small towns, are equipped with electric signs. On our line from Youngstown to Cleveland we maintain garages in Youngstown, Warren and Cleveland, with relief coaches for use that the service may be certain. On our line between Youngstown and Akron we maintain garages at Youngstown, Edenburg and Akron for the same purpose. We have never annulled a trip on account of ice, snow, fog or road conditions. We have operated this interurban service during wintry months when the operating expenses were more than twice the revenue obtained, feeling that when we have finally established the fact in the minds of the people that coach transportation is perfectly dependable they will feel as safe in undertaking a trip in zero weather as in balmy midsummer.

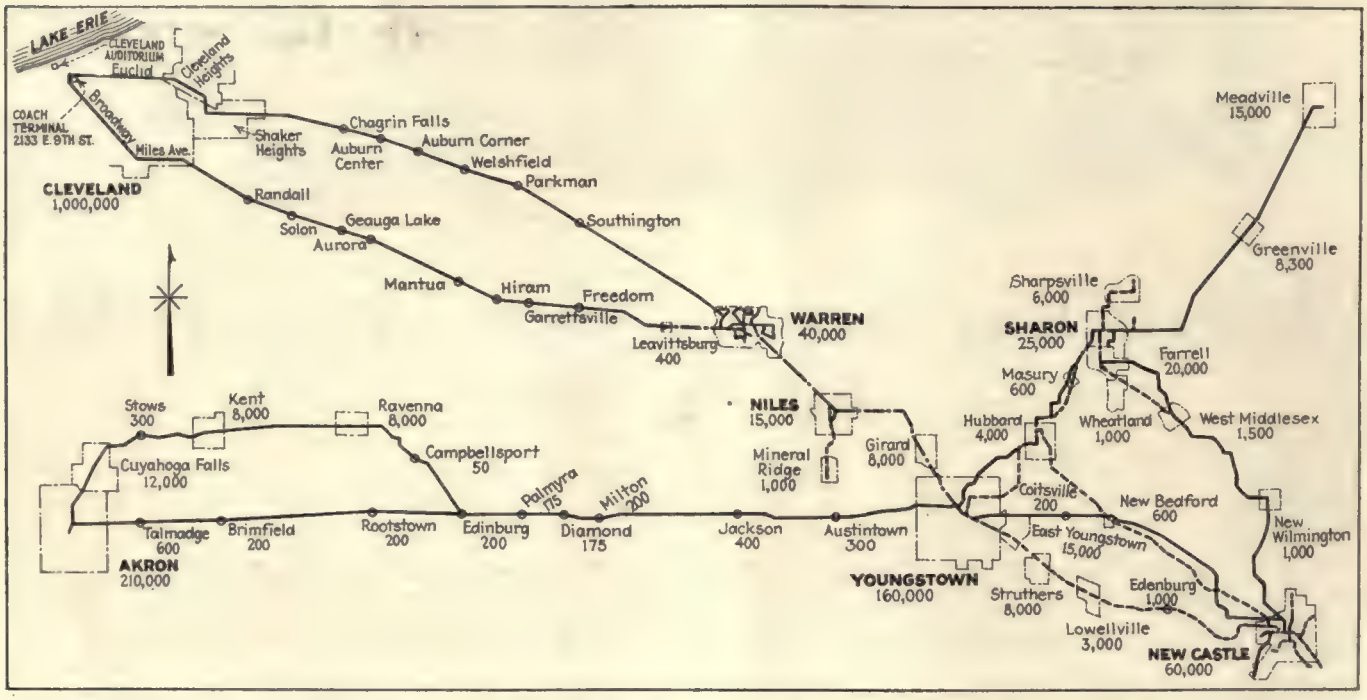
### Both Earnings and Expenses High

That our hope in this line is justified is indicated by the fact that our Youngstown-Cleveland line produces a gross operating revenue of 44 cents per coach-mile, which is the highest revenue per mile of either car or coach in our entire operations. However, our expense on these interurban lines, due to cost of terminal facilities, the elaborate arrangements made for maintaining our schedule and the high class of maintenance upon which we insist, is far beyond any figure that I have heard or seen quoted by proponents of bus operation.

For the first three years of our operation we charged off depreciation on our coach equipment at the rate of 25 per cent per year based on four years life of the operating units. In January, 1926, the condition of our original coaches and buses was such as to indicate that the four-year life predicted was too short and we changed our basis of depreciation to five years.

It has been our experience that maintenance expenses increase steadily over the life of the coach or bus in order to maintain the same degree of upkeep. We have seen many reports of bus operation indicating handsome profits which would have a tendency to deceive the promoters since it was a first year's operation, before heavy maintenance was reached.

In order to illustrate this point take the operating expenses of the Youngstown Municipal Railway for its bus operation by years. These were shown in Table IV in the article in last week's JOURNAL, page 376. To get a true picture of what can be produced in this operation and strike a parity between depreciation and upkeep, if buses were to be depreciated on a four-year period I believe the depreciation should be charged off as follows: 40 per cent the first year, 30 per cent the second year, 20 per cent the third year and 10 per cent the fourth year. Including depreciation as a part of the operating expenses, the operating expenses would be practically uniform over a four-year period.




Comparison of the Extent of Interurban Car and Bus Service by Pennsylvania-Ohio System

As a result of our experience, I have a few thoughts that I would like to submit to the motor bus manufacturers. The engineers seem vastly concerned about improving the design of the power plant, the shape of the combustion chamber, the contour of the heads and other refinements of this character. In our operation the maintenance of the engines themselves has never been a major problem. One of our principal worries is the matter of brakes; the largest number of interruptions to our schedule results from brakes and the largest amount of time spent in maintenance of any one item is on brakes. We have no unit in which we believe that the brake proposition has been solved. The brakes require adjustment too often, too much time is spent in relining and the job of relining is too much of a job. The use of air brakes has introduced another serious proposition and that is extraordinary wear on tires.

### Operating Features Overlooked in Design

The chassis builder does not seem to be concerned about time lost in filling buses with fuel. A large proportion of our buses require ten to fifteen minutes to

fill the tanks on account of flat filling pipes. Our state laws require the use of accurate speedometers. We have never had favorable results from speedometers themselves, or adapters or speedometer drives. I am the chairman of the committee on bus operation of the American Electric Railway Transportation and Traffic Association and I find that this complaint is universal throughout the industry, and have been asked to take it up with the motor equipment manufacturers in order to obtain some dependable and satisfactory means of ascertaining the speed of our units.

There have been great developments in the strength of such parts as frames, driving spindles, propeller shafts and other parts that take the strain of these heavy moving vehicles, but in our experience there is no excess strength in any unit that we operate. We do not believe that aluminum castings should be used in any chassis part where strain is to be undergone. We have had several cases of serious near-accidents due to breaking of the aluminum spiders on steering wheels.

Some of the Stations on the Cleveland - Warren-Youngstown Interurban Line of the Pennsylvania - Ohio Coach Company

1. Welshfield
2. Auburn Center
3. Chagrin Falls
4. Warren Terminal

### MUFFLERS INADEQUATE

It is necessary for a company operating buses and coaches to preserve pleasant public relations. More friction is developed between our company and the public with which we must live through inadequate mufflers than from any other source. In only one make of vehicle that we have used is there freedom from complaint on this source. Within the past months we have had several drivers arrested for operating with open cut-outs when we have no cut-outs on our coaches. We have been compelled to detour operations around hospitals and schools on account of noise complaints. One of the chief complaints against street railway service has been noise produced by cars. With the use of the automobile there is a chance to get away from this unpleasant factor, and yet after years of engineering on motor coaches and buses it seems impossible to have the engineering end of the manufacturing industry even give serious attention to this important matter.

Too little attention is given in coach design to safety considerations. There have recently been brought out designs in which it is impossible for the driver to see his right front fender or right curb except at some distance ahead of the vehicle. In our operation every other consideration is secondary to safety and we would never feel we were discharging our duty to the public and to our stockholders by operating a vehicle hopelessly handicapped from a safety standpoint.

Too little consideration has been given to the matter of providing for the use of chains in icy weather. I have heard it contended that certain vehicles do not need chains. We operate a great many different standard types of vehicles, and on the heavy grades on our interurban lines under the icy conditions that have prevailed this winter there have been a number of days when it was impossible to complete a trip without installing chains.

These matters are not of fundamental importance and of course will eventually be taken care of. The modern motor bus is a substantial, sturdy and useful vehicle.

From Any Seat in the Coach a Clear View of the Country Is Obtainable at All Times

On our property altogether we have 125 of them, representing an investment of nearly $1,000,000. The garages which are used by us represented an investment of $200,000 and parts and auxiliary property $150,000 additional.

Prior to our use of the bus in Youngstown there was not a single first class bus operated in the city. On our interurban operation we have purchased from time to time approximately eight operations. Only two of these owned any rolling stock that we would be willing to place in the service of the public. In the case of the two operations that did have rolling stock we could use, we paid a large part of the original purchase price to the manufacturer after we had purchased the property, notwithstanding the fact that the vehicles themselves were practically worn out.

We have increased the service substantially on every line that we have bought. We have co-operated with every independent bus operation in our territory. In Youngstown, Warren and Sharon we furnish the terminal facilities for all interurban bus lines and for a large part of the lines out of Cleveland. In co-operation with the leading independent bus lines in our territory we sell an interchangeable mileage book which enables the traveling public to ride easily and freely over northeastern Ohio. We sell through tickets from Cleveland to a great many different points in which a part of the ride is on our own line and a part of the route over independent bus lines. We have joint ticket arrangements with at least half a dozen independent bus lines that have no connection whatever with electric railway properties. We advertise their service in our schedules and in many cases extend the assistance of our schedule and traffic departments to those independent lines to help them to form their schedules and tariffs intelligently and to comply with the rather technical requirements of our public utilities commission.

The Cleveland Terminal of the Cleveland-Warren-Youngstown Coach Line Is at 2133 East Ninth Street, Not Far from the Center of the Business District

COMPARISON OF INTERURBAN COACH SERVICE AND INTERURBAN CAR SERVICE PENNSYLVANIA-OHIO SYSTEM—YEAR 1926

| | Coaches | Cars |
|---|---|---|
| Number operated | 29 | 27 |
| Revenue | $584,116.54 | $661,943.73 |
| Mileage | 1,910,940.58 | 1,743,553.10 |
| Revenue per mile | 0.305 | 0.382 |

If our history and attitude is in any manner typical of that of the electric railway industry, there certainly is every reason for co-operation between the electric railway industry and the great manufacturing industry furnishing bus equipment.

## McClintock Recommends Laws Against Slow Driving

ESTABLISHMENT of minimum as well as maximum speed limits is recommended by Dr. Miller McClintock, director of the Albert Russel Erskine Bureau of Street Traffic Control, to help relieve the growing traffic congestion in American cities. While excessive speeds are condemned as causes of delay and oftentimes accidents, Dr. McClintock suggests that minimum speed regulations be made of about 50 per cent the maximum on busy arteries. In discussing this problem Dr. McClintock said:

"Drivers who insist on holding up traffic to a snail-like pace of 5 or 10 m.p.h. on important streets should be subject to a certain amount of legal prodding. When streets are filled with vehicles the slow driver regulates the speed of all following traffic and by his selfishness or carelessness often delays hundreds. Slow drivers are also the unwitting cause of many accidents by making it necessary for overtaking motorists to cut into the opposing traffic stream to pass."

The Erskine Bureau has completed an extensive survey of street traffic in Chicago which discloses a typical set of obsolete laws, that according to the report were obsolete ten years ago. "Their chief service," says Dr. McClintock, "is to permit technically inclined public officials of some of the small cities of the Chicago region to levy unwarranted toll on the motoring public."

One of the recommendations in the Chicago survey abstracted in the ELECTRIC RAILWAY JOURNAL Jan. 8, 1927, will be to urge the state legislature to pass laws that will permit the city to enact ordinances regulating minimum as well as maximum limits on the streets.

This Exterior View of the South Shore Line's New Diners Vies in Beauty with the Interior of the Car. Streamlines and the Orange Color Enhance the Mechanical Perfections

# South Shore Line Starts Dining and Parlor Car Service

**Pullman Built Equipment Now Operating Between Chicago and South Bend, Ind., Provides Most Modern Facilities and Comforts for Windy City Passengers—Seven Thousand View Cars During Six-Day Exhibit Trip**

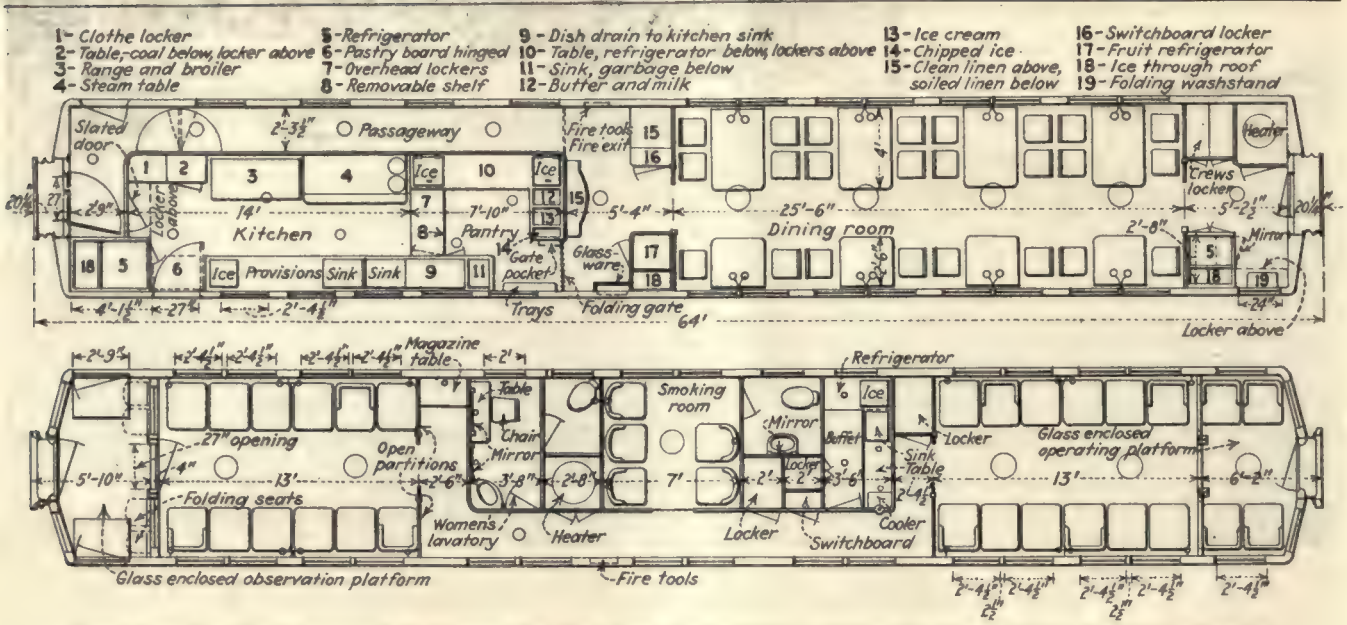
REGULAR operation of the new all-steel parlor-observation and dining car equipment of the Chicago, South Shore & South Bend Railroad between Chicago and South Bend, Ind., was inaugurated on Feb. 20, following a six-day exhibition of a train made up of the four new cars in the larger towns along the company's lines. The number that visited the cars during the public showing was estimated at more than 7,000 persons.

Names significant from the standpoint of the localities served have been chosen for the three dining car and two parlor-observation car trains that now operate in each direction daily. The dining car trains leaving Chicago at all mealtimes are known as the "Notre Dame Limited," "Indiana Limited" and "St. Joe Valley Limited." Parlor-observation trains in this direction in the forenoon and mid-afternoon are the "Duneland Limited" and "Marquette Limited."

The new cars, which were built by the Pullman Car & Manufacturing Corporation at a total cost of $185,000 and delivered to the railroad late in January, are of standard steam road Pullman car dimensions. Each car is equipped with six-wheel trucks, said to be the first of their type operated on any electric railroad in this country.

Finished with walnut woodwork, the parlor cars, 64 ft. x 10 ft., have glass-inclosed platforms at each end; they are furnished with comfortable folding chairs, and are heated by automatic electric radiators, while full-length windows afford an unobstructed view to the rear. The cars are arranged with the men's and women's lavatories, kitchen, switch cabinets and other appurtenances in the center, thus providing a parlor compartment at each end, next to the observation platform. A built-in writing desk and magazine table is located in each compartment. Every comfort has been provided

Exterior of South Shore Line's New De Luxe Parlor-Observation Car Showing Six-Wheel Truck Innovation and Glass-Inclosed Observation Platforms




Great Care Has Been Exercised to Arrange the New Cars Conveniently. Above, the Diner; Below, the Observation Car

for feminine passengers in the women's retiring room, which is attractively furnished with a small boudoir table, a full-length mirror and several smaller mirrors. Special care also has been exercised in equipping the men's lounging room.

Designed for buffet service only, the kitchen is a model of compactness. In its small area an ice box, sink, electric heater, humidor, water cooler and various cupboards are included. Among other interior decorations are dome ceiling lights, handsome side fixtures, two large electric fans and deep plush carpets.

Longer than any equipment now in service on the South Shore Line, the new diners, 64 ft. x 10 ft., are designed to serve 24 persons at a time, the seating arrangement conforming with that in vogue on the steam roads. The color scheme for the interior is green, decorated enamel, which is enhanced by dome ceiling lights, plush carpeting, and individual lighting fixtures over the tables. The kitchen compartment is designed for the maximum speed in serving, and besides the customary range there are several refrigerators, cabinets for linen, china, silver, provisions and fruits, three sinks and several large electric fans. Egress and ingress are obtained through centrally spaced doors as in the case of the steam road equipment. Rounded ends, streamlines and the striking orange color, standard for the South Shore, are some of the exterior features.

More than 125 newspaper men, city officials and other prominent residents of South Bend, Michigan City, Gary, Chicago and other cities reached by the South Shore Line were guests of the company on an official inspection tour in the new cars on Feb. 10. Aboard the train were Britton I. Budd, president of the railroad; B. J. Fallon, C. E. Thompson and H. M. Lytle, vice-presidents; Charles H. Jones, general manager, and other officials of the company and affiliated railroads and Charles Gordon, editor of ELECTRIC RAILWAY JOURNAL. The new de luxe limited trains now supplement the regular hourly express service between Chicago and South Bend and the half-hourly service between Chicago and Gary.

Incidentally, since the South Shore line has been under the control of the Insull interests, during the last two years $4,500,000 has been spent in rehabilitation of the property and an additional $2,000,000 will be spent in the next twelve months. Twenty-five new steel passenger cars have been placed in service and twenty more cars will be added during the summer.

Interior of Parlor-Observation Car Which Reveals Corridor Around Butler's Pantry and the Lounging Rooms for Male and Female Passengers

Dining Car Patrons Will Now Enjoy the Modern Appointments as Shown in This Interior Perspective. Decorated Green Enamel Is the Color Scheme

# Headway Recorders Centralized in Dispatcher's Office at Denver

*By Nelson R. Love*
Chief Engineer Denver Tramway, Denver, Col.

**Continuous Check Provided on Operation of Ten Car Lines—High Voltage Spark to Burn Paper Is Used Instead of Ink—Single Wire Suffices for Registering in Two Directions**

HEADWAY recording apparatus, arranged to register separately the time inbound and outbound at which cars pass given points on ten lines, has been installed in the dispatcher's office of the Denver Tramway. This centralization of equipment permits a continuous check-up by the dispatcher. Each route of the Denver Tramway is equipped with a telephone connecting with the dispatcher's office, located at approximately the center of the system. Cars are operated on printed schedules that are in the hands of all trainmen, but if any car is more than three minutes late the motorman reports to the dispatcher at the end of the line. Thus the dispatcher is able to issue such orders as may be required to operate the line to the best advantage under the circumstances. The method of dispatching used in Denver was given in detail in an article in this paper for Aug. 23, 1924, page 275.

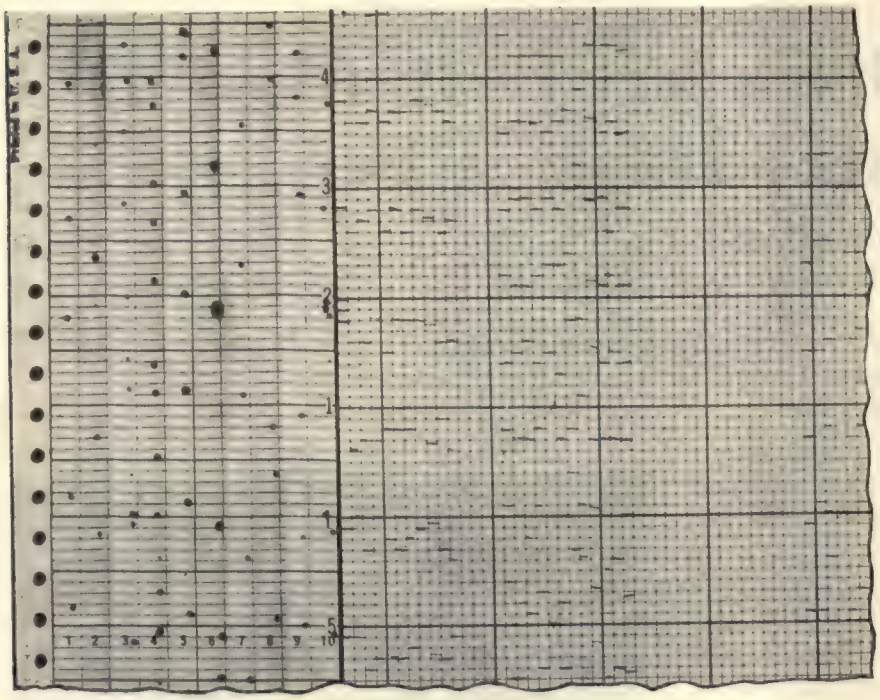
For recording headways the apparatus used is a continuous strip-chart type of instrument, with spaces for twenty indications. One is used for the outbound cars and one for the inbound cars on each of the ten lines at present connected. The chart speed is 6 in. per hour, or 0.1 in. per minute, making one-half minute variations in time readily distinguishable. An accompanying illustration shows the arrangement of the headway recorder on the dispatcher's desk. It will be noticed that the chart passes over the top of the desk with approximately three hours of chart visible at all times. The dispatcher marks the schedule time for each car in red on the chart as it passes over his desk, thus showing up immediately every car not on time.

The time scale employed on the chart renders the transfer of the daily chart record to a comparative line record a simple matter by using standard cross-section paper ruled ten lines to the inch in sheets 20 in. wide by 9 ft. long. This sheet suffices for recording 90 days' performance of one line, showing Saturdays, Sundays and week days, inbound and outbound, separately at the right. A portion of one of these records is reproduced. The mark at the extreme left of each series of days is the time at which the car is due.

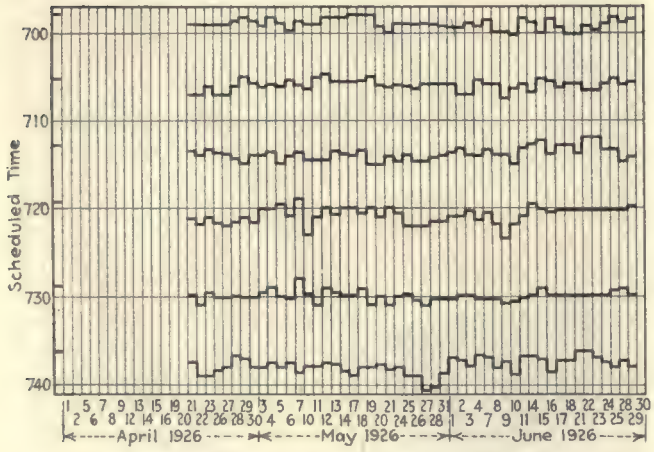
One clerk is able to take care of all of this work. The process of transferring the record consists in folding the original chart so that the line desired is at the edge. This is laid on top of the permanent record, alongside of the column for the day involved, and the time scale matched properly. The clerk then makes a mark for each mark on the chart, without reading or interpreting either the original or the new mark. About twenty minutes is required to transcribe the record for one line for one day.

Chart, on Which Are Registered the Headways on Ten Car Lines Operated by the Denver Tramway, Passes Over the Dispatcher's Desk

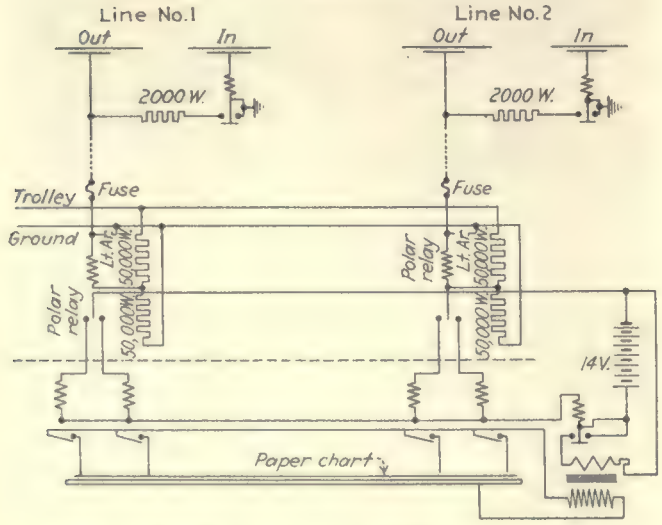
As originally set up, the recorder used capillary pens, each pen tracing a continuous line on the chart, and each car passage causing a horizontal offset to appear in the line. On account of passing over the dispatcher's desk, this method of marking the charts proved unsatisfactory. Various combinations of ink were tried. Oil would not dry at all. Water dried so quickly that the pens clogged. Alcohol made the ink run so freely that it dripped. Glycerine and water did fairly well, but would not dry completely. When the glycerine con-



Original Headway Record Made by Electric Spark (at Left) Placed Alongside a Large Sheet of 1-In. Cross-Section Paper (at Right) for Compilation of the Comparative Chart




Portion of Weekday Headway Record for One Line in One Direction for Three Months. The Schedule Time of Each Car Is Shown at the Left




Wiring Arrangement by Which Inbound and Outbound Cars Register Over the Same Wire

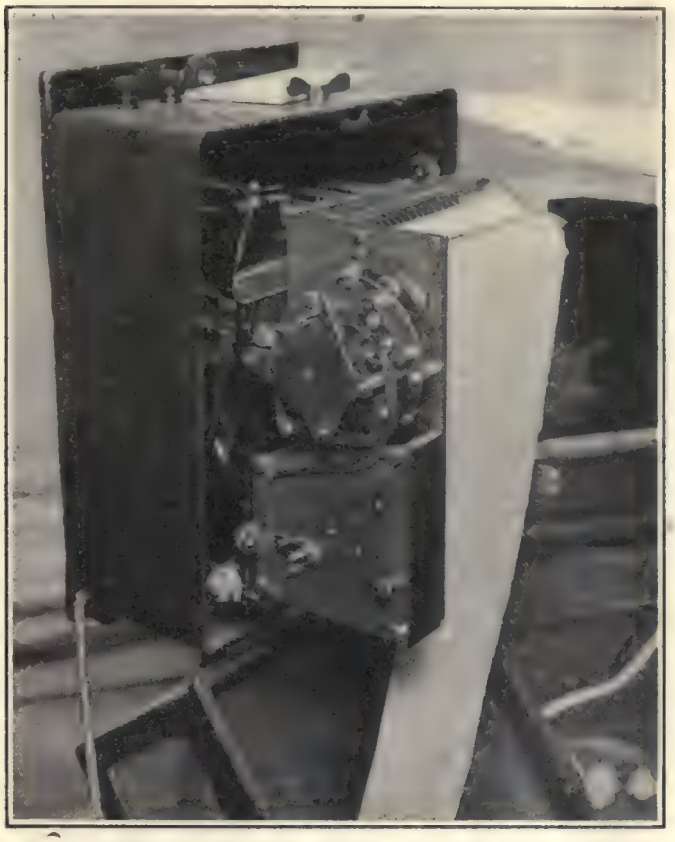
tent was kept down, the paper buckled from expansion, and so on. Finally the use of ink was given up entirely and an automobile spark coil was pressed into service. This has operated with no trouble whatever, each car passage being registered by a small round hole burned in the chart. It has black edges and so is readily visible on either a white or black backing.

The paper drive is operated electrically with a contactor on the pendulum of the master clock located in the dispatcher's office. This insures synchronism of time by which cars are dispatched and the record made by the automatic recorder. The master clock being a high-grade instrument with a mercury compensated pendulum, the error in the chart drive is only a few seconds per week. This is much smaller than the accuracy with which the chart can be read, and is not cumulative, as the paper chart must be renewed and the chart set anew each week. The driving mechanism consists of a 60-tooth ratchet wheel driven by an electromagnet energized once each second by the master clock. The ratchet wheel moves forward one notch upon release and is geared to the paper drive roll to give a chart speed of 6 in. per hour.

An interesting feature of this installation is the transmission of separate indications for outbound and inbound cars over the same wire. This is done by a polarized relay of telephone type at the recorder end of each wire. Current in one direction closes one contact, and current in the opposite direction closes another contact, operating the recorder itself with a local battery. Reversal of current is secured by connecting one terminal of the relay coil to the midpoint of a 100,000-ohm resistance between trolley and ground. The other relay terminal is connected to the line wire. Outbound cars connect the distant end of each line wire through a trolley pan direct to the trolley. Each inbound car operates a relay from a trolley pan connection, which in turn connects the line wire to ground. In order to prevent short circuit in the event that outbound and inbound cars of the same line strike pans at the same time, a resistance is connected between the trolley contact and the ground contact. This limits the current to about 0.25 amp. in such an event and does not interfere with the sensitive polarized relay used. Lightning protection to each polarized relay is provided by a vacuum type of spark gap arrester, with fuse in the line wire.

The spark to burn the indications in the chart is provided by a Ford spark coil. Its primary circuit is closed by a relay connected in the common local wire to the polarized relays, so that when one of the latter is operated the flow of local current causes a spark hole. The spark is distributed to the proper position on the chart by using the pens of the chart as relays to close the proper high-tension circuit through the appropriate spark gap, utilizing the movement of the metal pen to close a gap in the circuit.

One coil serves for all indications. If two cars were



Driving Mechanism for the Headway Chart Is Actuated by the Master Clock in the Dispatcher's Office

to cross contactors at exactly the same time, and for the same duration, only one indication could result. The chances of this happening, however, are extremely remote. Up to the present this never has taken place. Though two indications have been observed to come in so close together that the coil relay closed only once, two separate indications have always resulted. The wiring diagram for the polar relays, spark coil and recorder coils is reproduced herewith.

An inexpensive 14-volt storage battery supplies local current for all purposes, namely, paper drive, spark coil and recorder coils. This storage battery is charged continuously at a low rate by an electrolytic type of trickle charger, so that the storage cells used are of very small capacity. This battery has given excellent service and found to be ample for the requirements.

## First Electric Railway in Oklahoma Celebrates Birthday

THE Oklahoma Railway on Feb. 3 celebrated the 25th anniversary of establishment of street car service in Oklahoma City, Okla. The Metropolitan Railway, which afterward became the Oklahoma Railway, was the first electric railway established in Oklahoma. It started with less than 6 miles of single-track railway and has expanded until it now has 65 miles of track within the city limits as well as interurban lines.

Lawrence Paulson, veteran operator, now on the El Reno interurban line, was at the helm of the first street car that operated in Oklahoma City 25 years ago. The city declared a holiday to see the strange phenomenon. Crowds lined the streets and cheered. Bolder spirits swarmed inside and others, unable to get inside, climbed to the roof and hung their feet over the sides.

# Automatic Reversing Bow Collector

### One-Man Operation of a Small Shifting Locomotive Has Been Made Possible by Designing a Bow Trolley that Will Reverse Automatically

FOR handling passenger trailers in the yards and shops, the Toronto Transportation Commission uses a small locomotive which is called a "shifter" or "shunter." This railway operates 258 trailers in its passenger train service. Due to the number of these it has been found most economical to have the special car, since the movements are usually quite short and reversing is very frequent.

An automatic reversing trolley was found desirable so that the locomotive could be operated by one man. As a result, the car is equipped with a bow collector of quite novel construction and quite different from the usual form of pantograph. When the car is reversed the

The Bow Collector Is Shown in the Trailing Position on the Car Used for Shifting Trailers

direction of the bow collector automatically changes without breaking contact or without attention from the operator. In changing from one position to another, the supporting mechanism, which is ordinarily held in operating position by springs, is caused to depress against the spring action and thus provides space so that the bow collector will reverse and still keep uniform contact against the trolley wire at all times.

The use of a collector of this type has several advantages over the ordinary collector for this particular

type of work. The locomotive is used only to shift trailers. The fact that the collector cannot leave the trolley wire results in a considerable saving in time, labor and maintenance, since it is unnecessary to have a second man to handle the trolley pole.

Some minor changes were necessary in the overhead construction in order to provide for the use of this bow collector. It was necessary to have the trolley wire at quite uniform height and this does not vary by more than a foot between highest and lowest positions. It was also necessary to reverse the single and double-curve pull-overs, so that none of the overhead would be below the plane of the trolley wire. The standard trolley frogs, cross-overs and section insulators work equally well with the bow collector as with the standard trolley wheel.

## Huntington Completes New Trainmen's Rooms

NEW quarters designed to provide means for recreation in off hours have been provided by the Ohio Valley Electric Railway, Huntington, W. Va., for its employees. These rooms are in the same building with the general offices and directly across the street from the company's Huntington car station.

A Corner of the Main Floor Used for Basketball and Assemblies in the Recently Completed Trainmen's Quarters of the Ohio Valley Electric Railway at Huntington, W. Va.

On the Balcony of Huntington's New Rooms Devoted to Trainmen Are Pool and Card Tables. To the Left Are Seats Overlooking the Main Auditorium Floor.

A large room that can be fitted out as a gymnasium is provided for basketball, dancing and other general assemblies. On a balcony at one side pool tables are provided and several rows of steps or seats which will accommodate a small audience.

# The Readers' Forum

### *"Motormen's Badges Are Poor Advertisements for Heavy Interurbans"*

SAN FRANCISCO, CAL., Feb. 26, 1927.

To the Editor:

Years ago practically all interurban electric lines were nothing more than extended street car roads, frequently using city equipment. No one seriously regarded them as main line railroads. The steam roads thought them more or less a joke. Some of these interurbans, however, have changed with the years. They have come to realize that their service and equipment must be brought up to the standard of the steam railroads.

Changing from extended street car line to heavy electrified main line has cost many millions of dollars. Street car methods were dropped, because the public would not stand for a street car on a 50-mile run. But, strange to say, one relic of the past has remained. His name is Mr. Motorman, or "Scissorbill," as the steam roads call him.

Generally he is made conspicuous by a badge. If a sign were painted on each interurban coach, sleeper or diner reading, "This is a street car line," it wouldn't have any worse effect on public opinion than does the motorman's badge. Why? Simply because "motorman" is a street car word. It is out of place in heavy interurban service. The public is used to coupling the word "engineer" with railroads. If electric interurbans would use the title when referring to their motormen it could not but be beneficial.

Almost any one can be a "motorman" after a couple of weeks training, but a locomotive engineer is different. The public has learned that he is a highly trained man, and he is. It takes almost as long to train an interurban motorman as it does a steam railroad engineer, but few people know this, because they usually think of only one kind of motorman—the street car motorman.

Personally, whenever I ride on one of the electric lines that designates its trainmen as "motormen" I cannot help but wonder how safe the man is, or how long since he was promoted from city service. Surely if this feeling is shared by many, a motorman's badge is not a good advertisement. I believe it would be a good idea for the heavy interurbans to abolish the motorman's badge and adopt an engineer's badge. That is the practice in the West on heavy interurban lines owned by steam roads.

If the steam roads can designate a man as "engineer" at the controller, so can the electric lines. Many of the latter have abolished the blue uniform for interurban motormen and adopted in its place a locomotive engineer's outfit—overalls and jumper. Motormen on such lines haven't swelled up and asked for more pay. Neither would they if they had engineers' badges. Interurban motormen, as a rule, are highly intelligent men and they do not expect standard steam road pay, but they do not like to be known as motormen, as I have found out by talking to several of them.

I believe also the use of gongs in motormen's cabs instead of air whistles cheapens the road in the eyes of the public. Ding! Ding! let's go, street car! The street

car foot gongs are bad; use the air whistle and be a railroad. A locomotive bell attached to the roof is another good thing to dispel the street car impression.

AN INTERURBAN PATRON.

## *Older Cars Should Not Contrast Too Greatly with Recent Purchases*

UNION STREET RAILWAY
NEW BEDFORD, MASS., Feb. 10, 1927.

To the Editor:

If we are to continue to exist as a transportation agency, and I firmly believe that we are, we must devise methods of attracting more patronage to our vehicles. Economical operation, while in itself of great importance, is not derivative of increased gross incomes. Our vehicle, whatever its kind, must be sufficiently attractive to invite patronage. Otherwise individual transportation units are bound to be used. One way to secure this increased patronage is by the operation of modern, attractive rolling stock. Careful consideration of modern cars makes one realize that they produce more intangible than tangible benefits. Even though up-to-date cars may not bring immediate large increased receipts, it is certain that the continued use of old, untidy cars will not encourage new traffic and will, as a matter of fact, discourage more and more of the present riding.

The general public is not willing to buy the same kind of merchandise for any length of time. Styles are continually changing and merchants are constantly endeavoring to satisfy the demands of their public. With this desire for new things uppermost in the minds of our patrons, it is no wonder that they expect us to improve and there is no better way of calling our improvements to their attention than by keeping our rolling stock up to date. The private automobile has taught people to enjoy a more comfortable method of transportation, and if we are to encourage this class of patronage we must appeal to them from the standpoint of service and comfort, as well as from the economical side of the question. Street cars are of a size and construction that afford greater opportunities for producing a more finished piece of workmanship than is possible to obtain in the smaller transportation units.

In New Bedford attractive and efficiently maintained rolling stock has done more to develop a spirit of friendly co-operation between the public and the company than any other individual item. For years cars have been painted or varnished every year, and a very thorough system of cleaning has been followed closely. No matter how attractive and comfortable new cars may be when delivered, their benefits will be short-lived if not accompanied by a very thorough system of maintenance and cleaning. Plush seats will not remain attractive very long unless they are cleaned nearly every day. It is also important that our de luxe improvements should be practical and easy to keep clean, as well as be attractive.

New appliances have been added from time to time to the existing rolling stock in New Bedford, so that there is not a great contrast between the older cars and those recently purchased. The public judges a railway's physical condition more from its complete complement of rolling stock than from a few pieces of equipment that were recently purchased.

It has been our endeavor to have our cars operate as quietly as possible and as a means to this end we have given special attention to the proper maintenance of our car trucks. Bearings, gears, wheels, journal boxes, brake riggings, etc., have been inspected and repaired constantly so that they would not produce rattles when the car was in motion. The track has also been efficiently maintained so as to give a very smooth ride; in many instances smoother than that obtained by the best of motor coaches.

In the last analysis it remains for the "men who man the cars" to sell our "product." The training and supervision of this personnel is very important, and the use of a modern training school, full-time instructor and several supervisors have played an important part in developing an efficient corps of transportation salesmen. Friendly co-operation and a thorough follow-up have been the secret of our success along this line.

HAROLD E. POTTER,
Assistant Superintendent of Transportation.

## *Popular or Mass Transportation?*

MOUNT VERNON, N. Y., Feb. 16, 1927.

To the Editor:

'Twill be recalled that when Miss Julia Capulet learned that her Romeo was of the hated Montague clan, she cried: "What's in a name—a rose by any other name would smell as sweet."

So does one feel with regard to the efforts being made to foist new words on the public in cheerful disregard of the fact that most really popular words like "trolley," "jitney," "wow" and "movies" are the inspiration of the man in the street and not the perspiration of the press agent in the office.

You can call a morgue a "mortuary chapel," but the corpse is just as dead in his "casket" as in a coffin. The slithering wight who dresses him for eternity is still an undertaker or funeral director rather than a something rhyming with logician and mathematician.

A barber is still a hair-cutter who barbs and bobs—not a person addicted to tonsils. The alligator pear will taste no sweeter for being called by a name suspiciously like "advocate" in Spanish. And now the dentists want to be called gnathists, which makes us gnash our teeth.

A bus is a bus and a coach is a coach despite the effort to identify a lower form of street car with the luxury of an enlarged limousine.

Coming still closer home, know ye that since the horse car disappeared the ELECTRIC RAILWAY JOURNAL has tried to encourage the use of "carhouse" or "car station" for "carbarn," but even the younger generation sticks to "barns."

It may be that "mass transportation" carries implications of wretched service and poor equipment. However, in the writer's judgment, this term is rather a technical one used among ourselves to express the handling of business *en masse* as distinguished from transportation of small groups at special fares and under special conditions. To substitute "popular" for "mass" would rob the term of its precise meaning. Which is more popular if you have the price: A public utility car or bus, or a private motor car? Let us say directly to the public: "This Is Popular Transportation" only when we are doing something to make it more beloved, whether in fares, in service or in quality of equipment. This writer, for one, sees infra-red when a high-falutin' name beplasters a low-down object. Shades of "Euphues"!

WALTER JACKSON.

# Maintenance Notes

## Motor Rheostats Installed on Car Roofs

MAINTENANCE of motor rheostats was a large annual expense to the Jamestown Street Railway, Jamestown, N. Y., until J. L. Conner, superintendent of motive power, removed them from beneath the car and reinstalled them on the roof. Broken grids and grounded rheostats were a source of continual trouble when the rheostats were located beneath the car. Although suitable splash guards were installed

Trouble with Resistors Has Been Eliminated by this Car Roof Mounting in Jamestown, N. Y.

between the rheostats and the truck wheels, the mud and water entered, causing insulation breakdowns and burnouts, with resulting road delays. Also foreign particles were being continually picked up and deposited against the grids, causing breakage.

To eliminate this source of failure the rheostats have been reinstalled on the roof of the car. They are mounted on a piece of 1-in. asbestos lumber, fastened to the trolley board through suitable porcelain insulators. Protection from the elements is afforded by $\frac{1}{16}$-in. sheet metal plates fastened securely to 2-in. vertical steel angles, forming a box around the rheostat. These angle posts are bolted to the trolley board. The side plates are so installed as to permit of free air circulation and heat dissipation by leaving openings near the top plate and the trolley board. The cover plate is fastened to the vertical post. It is sloped to cause deflection of rain and snow.

The cost of labor and material was approximately $50 per car. The company claims that these rheostats have not needed a penny of maintenance expense since they were installed in their new location, and therefore they consider the expense of the installation was a very good investment.

*Neglect your maintenance, and equipment upkeep,*
*And you're on the "One Way Street," to the scrap heap.*

## Fire Equipment Location Shown by Striking Colors

LOCATIONS of fire extinguishers and sand pails in the shops of the Grand Rapids Railway, Grand Rapids, Mich., are painted red with a yellow border. These colors can be seen at a considerable distance and are sure to attract attention. Each fire station is numbered and a man is assigned to each particular station. For convenience, many of these are located on posts throughout the building. An accompanying illustration shows such a fire station.

Fire Station Located on Central Posts in the Shops of the Grand Rapids Railway

In this case the number for the fire extinguisher is 55 and that for the sand pail 56. A small shovel is also used as part of the equipment for spreading sand.

## Compressor Outfit on Bus Chassis

USE is made by the Los Angeles Railway of a standard White 15-45 bus chassis for mounting a large size portable air compressor outfit. The chassis, about to be scrapped by the bus department, was reclaimed by the way and structures department and with some minor modifications fitted for its new duties. Additional springs were placed on top of the regular springs at the rear. The pneumatic tires and wheels were replaced with solids of the same type as those used on double-deck buses.

Portable Compressor Outfit Assembled in Bus Chassis by Los Angeles Railway. Boxes on the Sides Hold Various Air-Operated Tools.

At Work with Air-Operated Tamping Tools on a Double-Track Crossing. The Air Used Is Furnished by the Portable Outfit Mounted on Bus Chassis

The compressor unit, consisting of an Ingersoll-Rand 245-cu.ft. pump driven directly from the trolley by a 600-volt motor, is carried on a channel sub-frame. This in turn is fastened to the main frame. The size of the chassis allows for a generous spacing of the several parts as well as the installation of tool boxes on the sides and a hose reel on the rear. This reel is inclosed in a sheet metal cabinet having double swinging doors which open to the rear. About 200 ft. of air hose can be carried on the reel, which has a diameter of 18 in. and a length of 30 in. with 30-in diameter flanges at the ends. The shaft of the hose reel extends through the side of the cabinet to take a cranked handle for winding in the hose.

On top of the outfit is carried a folding arm for making contact with the trolley. This is made of 3-in. x 2-in. ash jointed about 6 ft from its upper end. It is fastened to the top rear edge of the hose reel cabinet by a bracket and pin. The point of attachment is about 3 ft. from the lower end. The pin allows the boom to be raised by depressing the end which extends to the rear. The upper end is fitted with a piece of bare trolley wire, which is connected through jumper cable to the controller of the motor.

When down, the boom is folded back on itself and rests on a bracket support on the roof at the forward end of the compressor outfit. On the job, the folded boom is raised, the upper portion extended by a rope and the bare contact wire placed against the trolley. The weight of the boom maintains the contact.

Tool boxes on the sides are made of ¾-in. wood sheathed with sheet metal. They are of such size as to hold conveniently the air tools used for tamping ballast and other operations for which the air outfit is used. The metal covering protects the boxes and also gives a finished appearance.

Another feature of the installation is the air-distributing manifold with its six operating outlets. A piece of 2½-in. pipe is brought out of one end of the air tank and carried in a double bend back to the compressor frame base. Here the manifold, made of 3-in. steel tubing, is supported by brackets on the base of the compressor. The supply pipe enters one end of this manifold. The other end is closed. The service outlets, spaced on about 4-in. centers, leave the top of the manifold. A valve controls each outlet.

This installation on a bus chassis has proved so satisfactory that the department now has under construction an electric track welding outfit on a similar chassis.

# Axle-Bearing Maintenance Decreased

CAREFUL analytical study of motor axle-bearing maintenance expense on the Danville Traction & Power Company, Danville, Va., indicated that a very appreciable saving could be obtained if a bearing having a high percentage of zinc was adopted as standard.

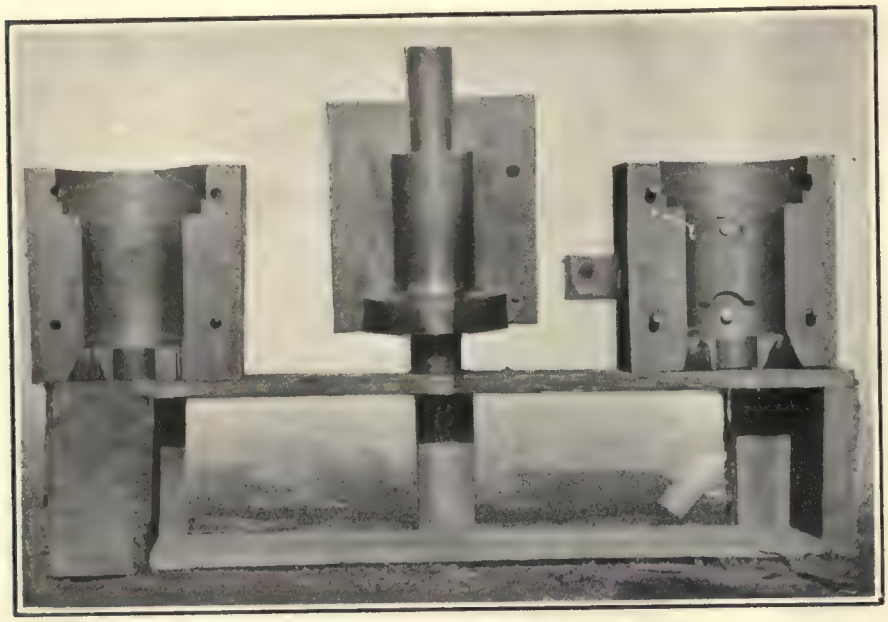
The annual expense of axle-bearing maintenance formed a major portion of the total annual motor expense, as considerable trouble was experienced with axle-bearing breakage. Practically all of these broken bearings had to be scrapped and new bearings substituted. Some of these broken bearings were practically new, whereas others were only half worn out. Nevertheless, it was found necessary to scrap them due to the character and location of the breaks and the expense of making repairs.

Set of Composition Axle Bearings Removed from Mold and Ready for Service

Experiments were started on the axle bearings of the GE-265 motor. A three-section steel mold was made in the shop. Careful consideration was given to the expansion and contraction factors of this mold, together with the shrinkage of the bearing metal, in order that a bearing could be removed from the mold and placed in service without any machine work other than slight filing of the edges. This mold is of rugged construction and is provided with heavy straps and dowels, so that the parts are held together accurately when assembled for the pouring of the metal. Provision is also made for casting the bearing waste window and dowel holes.

Bearings with various combinations of zinc, copper, tin and aluminum were cast and tested in service. After several trials, it was decided that the most satisfactory composition for toughness, nonbreakage and long life was 75 per cent zinc, 5 per cent copper, 10 per cent tin and 10 per cent aluminum. All of the GE-265 motor axle bearings have been equipped with bearings of this composition. Results obtained have been far better than was expected.

It is stated that two men can manufacture twelve sets of these



Appearance and Construction of Three-Section Mold Used for Manufacture of Axle Bearings

bearings an hour and that the bearing maintenance expense has been reduced 75 per cent since their installation. All broken or worn-out bearings are cleaned thoroughly and remelted for the manufacture of new bearings, so that little or no waste is experienced.

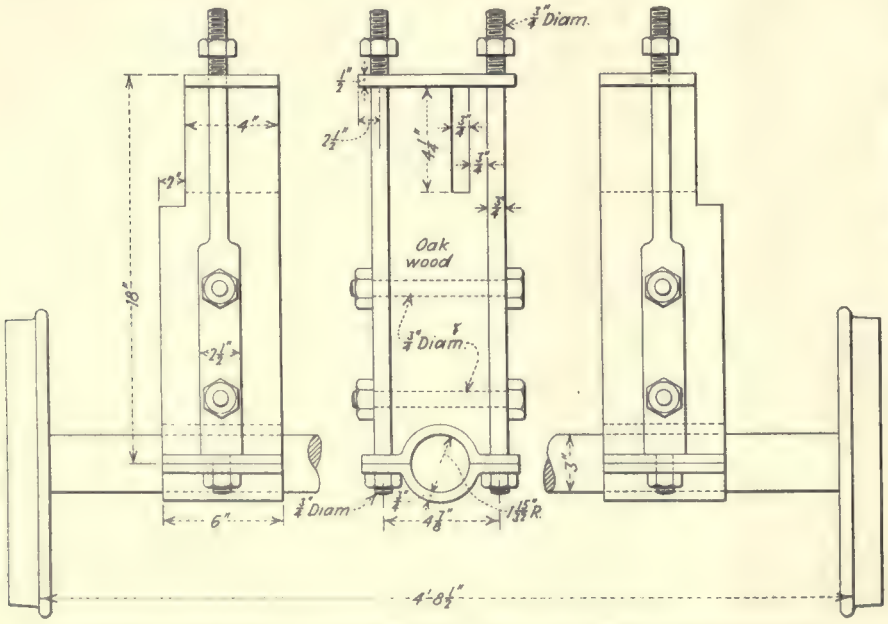
The results that have been obtained have been so encouraging that it is proposed to install these bearings on all motors in operation on the property.

*Don't be a dead one, and have them "Say it with flowers," Oil, inspect and overhaul your cars based on consumed power.*

## Transporting Car Trucks with Broken Axles

SERVICE interruptions caused by broken axles have been reduced to a marked degree on the property of the Virginia Electric & Power Company, Richmond, Va., by the use of a dolly truck designed by the master mechanic, W. S. Hicks, and constructed in the shop. This truck consists of a pair of 11-in. flanged wheels with a 4-in. face, mounted on a 3-in. axle. Two pedestals are clamped to the axle and arranged for the support of the end of the truck frame. The body of the pedestal consists of an oak block about 17½ in. long, 6 in. wide and 4⅞ in. thick. The upper part of this block is notched to receive the steel angle frame of the truck and the lower end is fitted to the upper half of the axle clamp. A steel plate mounted on the top of the block provides a means for holding the truck frame angle rigidly in place. Two ¾-in. x 2½-in. flat bars, rounded on the ends and threaded, fasten the axle clamp to the axle and the truck angle frame to the pedestal. Two ¾-in. through bolts prevent splitting of the oak block and at the same time prevent shifting of the various parts. With the pedestal axle clamp fastened solidly to the dolly axle and the end truck frame angle set in the oak block slot and clamped down by the ½x4-in. plate a solid support for the truck is provided which permits skidding it to the place desired.

This equipment has afforded a means for rapid transportation of the car with the broken axle.




General Appearance of Assembled Dolly Truck. In Center, Appearance and General Dimensions of a Pedestal

# New Equipment Available

## Mica Undercutter Reduces Labor Costs

USE of a cutter of only 3/32 in. diameter to facilitate ease in guiding and cutting commutator mica is a feature of a new electrically operated portable mica undercutter manufactured by the Hullhorst Micro Tool Company, Toledo, Ohio. This undercutter is sturdy and compact in construction and simple in operation. It can be operated at rapid speed by an unskilled man. An in-

Portable Undercutter, Operating Handle and Other Details

experienced workman can undercut mica to a depth of 1/32 in. with this machine at a speed of 100 to 200 ft. per hour. The width of cut depends on the thickness of the cutter.

The machine is driven by a Westinghouse motor and can be operated from any 110-volt lighting circuit by means of the attachment cord and plug. It is carried easily from one place to another by means of a case supplied with a leather handle.

# Association News & Discussions

## Central Traffic Meeting at Indianapolis

IN ACCORDANCE with the action taken at the last meeting of the Central Electric Traffic Association, the next regular meeting will be held at Lincoln Hotel, Indianapolis, Ind., on March 16 and 17, 1927, beginning at 9 a.m. Wednesday morning's session will be in the nature of a round-table discussion. Necessary committee work will be done the afternoon of March 16. The Thursday session will be devoted to reports of committees and such other business as may be properly presented.

Hotel reservations should be made with the Lincoln Hotel direct.

## Southern Equipment Men Admit Manufacturers

MANUFACTURING companies or manufacturers' agents handling equipment or materials used by street railway operating companies may now be admitted as associate members of the Electric Railway Association of Equipment Men, Southern Properties. At the recent meeting of that association held in Memphis the by-laws were changed accordingly.

Dues for these associate members are fixed at not less than $10 per year, payable Jan. 1 for the ensuing year. Manufacturers or their agents wishing to become members should make application to the secretary of the association, A. Taurman, 2100 First Avenue, Birmingham, Ala.

# American Association News

## Rapid Transit

GENERAL discussion of rapid transit problems existing in the larger cities of the country took place at the meeting of the committee on rapid transit of the American Electric Railway Association held in New York on Feb. 25. An interesting point developed was that while rapid transit presents many peculiar problems individual to the local community, certain fundamental thinking should soon develop on principles. This should be set forth to guide cities facing the rapid transit situation in the coming few years. Managers of transportation companies in those American cities just below the fifth and sixth in size should have available fundamental data relative to types of systems, methods of financing and physical construction. These include relative advantages of two-track versus four-track tubes, minimum width of street to accommodate each and the economic conditions necessary for the various steps in the development of rapid transit business.

Members present were G. A. Richardson, chairman; D. L. Turner, Edward Dana, S. E. Emmons, R. E. Kerins representing J. S. Doyle, J. B. Stewart, Jr., Thomas Fitzgerald, E. J. McIlraith, R. F. Kelker, Jr., C. A. Burleson representing H. L. Andrews and H. E. Ehlers.

## Special Rolling Stock Committee No. 2

DISCUSSION of essentials to be considered in the standardization of motor coach design and rules for inspection and maintenance of buses occupied the attention of special rolling stock committee No. 2, which met at association headquarters, New York, Feb. 7. Those present were V. W. Berry, chairman; H. C. Eddy, F. A. Klock, L. H. Palmer, T. L. Preble, A. J. Scaife and C. W. Stocks.

At the afternoon session G. H. Scragg, International Motor Company, who is also chairman of a committee formed to study and recommend uniform specifications for standard motor buses, was invited to describe the results which were being accomplished by his committee and work which they contemplated. He outlined a plan for a code of uniform requirements governing bus construction and explained that the work of his committee was sponsored by the N.A.C.C., which would print the final draft of the report. The report as at present outlined consists of five parts: (1) An introductory chapter giving general developments of the bus and looking forward to interstate regulation in 1928; (2) an analysis of the outstanding conflicts in the various state laws which have been analyzed to show how concessions can be made; (3) a discussion of every phase of regulation, both known and anticipated; (4) code of recommended practice to make possible the utilization or standardization of vehicles both as to size, weight and other requirements for the safety of passengers; (5) a complete index.

To avoid duplication of effort and save time, it was considered desirable to effect a close-working arrangement with Mr. Scragg's committee. This is to be done through Messrs. Stocks and Plimpton, each of whom is a member of one of these committees. Mr. Eddy, who is a member of the staff of the Board of Public Utilities Commissioners of New Jersey, explained how the standard motor bus specifications of that body were drawn up and told of the procedure used in reaching agreement. Mr. Eddy explained that there now are two sets of specifications being prepared, one to apply to buses of the city type, single deck, and the other to buses of parlor car design.

With regard to the subject of inspection and maintenance standards, it was decided that questionnaires would be sent out asking for information as to methods that various companies are using. Members of the committee are also to communicate with companies in an effort to develop sufficient information on which to base recommended practices.

### COMING MEETINGS OF *Electric Railway and Allied Associations*

*March 8-10* — Oklahoma Utilities Association, ninth annual convention, Huckins Hotel, Oklahoma City, Okla.

*March 16-17* — Central Electric Traffic Association meeting, Lincoln Hotel, Indianapolis, Ind.

*March 17-18*—Illinois Electric Railway Association, seventh annual joint convention, Hotel Abraham Lincoln, Springfield, Ill.

*April 1*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

*April 26-29*—Southwestern Public Service Association, convention, New Orleans, La.

*May 31—June 1-2*—Canadian Electric Railway Association, annual convention, Winnipeg, Man.

*July 27-29*—Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.

*Oct. 3-7*—American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio.

## Public Service Section

UPWARD of 500 members attended a meeting of Public Service Company section A.E.R.A. on Feb. 18, at Newark, N. J. P. S. Young, vice-president of Public Service, and F. M. Rosseland, secretary-manager of the Newark Safety Council, spoke. Officers for the coming year were elected as follows: President, Philip F. Maguire; vice-president, Howard Briggs; secretary-treasurer, Joseph O'Driscoll; director for one year, William H. Shepherd; director for two years, James M. Symington; director for three years, George L. Walsh; director ex officio, Matthew R. Boylan.

There are now 395 members in the Public Service Company section, an increase of 77 since the gathering held last year in Jersey City.

# The News of the Industry

## New Franchise Draft in Omaha

A committee of 56, comprising leading business, professional men and labor leaders, has prepared a draft of a new franchise ordinance for the Omaha & Council Bluffs Street Railway, Omaha, Neb., that will be presented at once to the Council, with the request that it be voted on at the general city election on May 3. The franchise drawn by the company and submitted a year ago was voted down.

The new draft provides that the franchise shall run for 30 years instead of 40; that it may not be assigned to any out-state corporation or person; that the state royalty tax of $1,000 a year shall not be in lieu of occupation or similar taxes which may be assessed; that the Council may order extensions of lines, including bus service; that the company shall pay for paving, resurfacing and raising of track costs when ordered by the Council.

John L. Kennedy, a prominent citizen, who took the leading part in the negotiations, said that this step was necessary in order to save the railway system for the city. Action was vitally necessary this year as the company's $9,000,000 of bond indebtedness becomes due Jan. 1, 1928. Mr. Kennedy said that if the franchise election failed the city would be confronted with the danger of a receivership and a crippled system of transportation that might involve suspension of operation.

## Discussion Put Over Until After Chicago Aldermanic Election

On Feb. 9 the committee on local transportation of the City Council of Chicago held its most recent meeting. At that time Alderman Joseph B. McDonough, chairman, complained of his inability to get all sides into a meeting at one time. It was suggested that three meetings be called on the theory that at one of those three meetings it might be possible to bring all the interested parties in.

A few of the Aldermen were frank enough to admit that they were not interested in traction matters or anything else just then, being in the midst of the aldermanic campaign. A motion to postpone all meetings until after Feb. 22, however, was defeated.

Bankers, traction officials and chairmen of the various bondholders' protective committees are prepared to tackle the situation, after the Aldermanic election. Now it appears that nothing is to be done until after the election on April 5.

Inquiry at the office of the transportation committee elicited the information that no meetings have been called and that none is contemplated until after that date. It is possible that some consideration will be given Mayor Dever's subway plan, but this does not involve any of the ordinances now before the committee.

Clarence E. Richard, writing in the *Journal of Commerce*, said:

> While the city hall seethes with pre-campaign turmoil and Aldermen are busy building their political fences and lining up their supporters for the mayoralty election in April as well as for the run-off between the high men, the traction problem has been lost sight of.
>
> Frequent attempts to get some one to discuss the question met with only puzzled looks—as if the city hall was unaware that settlement day is fast approaching, that the surface lines are now operating on a day-to-day grant that expires in a few months even if the maximum period is used up.

## International Schedule Approved

The Public Service Commission on Feb. 24 revoked orders suspending schedules filed by the International Railway on Sept. 16, 1926, making increases in its rates for transportation in Lockport and on the Buffalo-Niagara Falls High-Speed Line and the Buffalo-Lockport-Olcott Divisions, and permitted the company to make the schedules, as filed, effective March 1 and to remain in effect for one year thereafter or until further order of the commission. The new fare in Lockport will be 8 cents. Six cents is now charged. The rate on the two other division will be increased from 2½ to 3 cents a mile.

Hearings were held by Commissioner Fooley in Buffalo and evidence was submitted covering operations in Lockport to Sept. 30, 1926. The commission's accountants allocated the fixed capital of the International Railway to the various communities served by it and also the revenues and expenses. The result of the commission's examination showed an operating deficit in Lockport of $37,640. The commission holds that the present 6-cent rate in Lockport is "insufficient to yield reasonable compensation for the service rendered and is unjust and unreasonable." The fixed book capital, as allocated to the city of Lockport, was $1,092,580.

The new mileage rate tariff applies to and from stations on the Buffalo-Niagara Falls High-Speed Line, also from Buffalo and Niagara Falls to Lockport via Division Street in North Tonawanda and to and from all stations between Buffalo and Olcott on the Buffalo-Lockport-Olcott Division, also from Buffalo and Lockport to Niagara Falls via Division Street.

The investigation by the commission brought the examination of the company's books down to Sept. 30, 1926, showing investment in road and equipment and operating results, segregated by localities. This investigation, based on book figures, disclosed an operating income of $113,488 for the year ended Sept. 30, 1926. The operating income of $113,488 provides a return of 1.61 per cent on the value of the road and equipment, $7,035,738, used in giving service on the two divisions.

## Seven Cents in St. Louis—Grant Before Voters

The United Railways, St. Louis, Mo., on March 1 returned to the 7-cent fare as a result of the decision on Feb. 25 by a special court of three federal judges at Kansas City, Mo., which held that the company was not entitled to a continuation of the 8-cent fare or two tokens for 15 cents, a rate which went into effect temporarily on Feb. 7. The special court ruled that the federal court at Kansas City lacked jurisdiction so long as the railway's application for increased fare was pending before the Missouri Public Service Commission, inasmuch as the state body had not unduly delayed a decision. Under the terms of the court's ruling the railway is supposed to return to each patron the excess fare charged from Feb. 7 to March 1. The sum so to be returned is not believed to exceed $3,000 as receipts for extra fare were given to passengers only on request.

The United States District Court at Kansas City had previously issued a temporary restraining order against the Missouri Public Service Commission and other state officers to prevent interference with the charging of the higher rate of fare.

On Jan. 7 Receiver Wells had informed the commission that the company would put into effect the increased fare schedule in 30 days. The commission later suspended this schedule and it was then the company appealed to the federal courts.

The special court pointed out that the state commission had proceeded to examine into the fare situation as expeditiously as its machinery would permit and that the company should not have sought to override this process by filing its arbitrary schedule on Jan. 7. The three judges agreed that there was no evidence of dilatory tactics on the part of the commission.

The commission is expected to complete the audit of the company's books by March 10 and a decision in the application, which was filed June 7, is anticipated shortly after the commission audit is filed.

Mayor Victor J. Miller of St. Louis, Mo., will not officially present to the Board of Aldermen at this session of the board the measure to grant a blanket franchise to the St. Louis Public Service Company, which plans to purchase the properties of the United Railways at foreclosure sale in the near future. The Mayor has already made public the terms of the measure as tentatively drawn following numerous conferences with representatives of the company. It is the present plan of the Mayor to permit the company to propose the bill to the Board of Aldermen or to the voters by initiative petitions. He prefers a di-

rect submission to the people. The company also wants the voters to pass on the measure.

The bill as drawn provides for a 30-year franchise if passed by the aldermen and a 50-year grant if the people approve. The company will operate on the service-at-cost plan under the bill. The time is now too short to get the proposition on the ballot at the municipal elections on April 5. The bill provides that should a special election be necessary the company must defray the cost of holding such election. This would amount to almost $50,000. The present session of the Board of Aldermen ends on April 11. A new president and fourteen of the 28 members of the board will be elected in April.

## Open House in Williamsport—Carnations for the Ladies

During Saturday afternoon and evening, Jan. 22, the new carhouse and shops of the Williamsport Passenger Railway, Williamsport, Pa., were visited by more than 2,000 citizens of Williamsport. The company had invited the public to inspect its new quarters at West Third and Park Streets, and from 2 in the afternoon until 9 at night the place was thronged with visitors.

A number of very interesting and unusual features in the building were explained, and on exhibition were three new cars. On the new cars were signs describing them, and on the old car was a sign calling attention to its dilapidated condition and stating that after all the contemplated improvements were completed the company did not expect to operate cars of that character except in emergencies.

On the walls of the building were signs and charts and one large map showing the new trackwork that was done in 1926 and the cost of each item. Another sign described the "weekly pass," which the company was to put in use under the new fare plan, arranged to go into effect about March 1. Another sign had a large drawing of the metal tokens that will be sold two for 15 cents under the new fare plan and also contained two sample tokens, so that those visiting the exhibit could become familiar with them.

Music was furnished throughout the afternoon and evening by a ten-piece orchestra and coffee and doughnuts were served, the doughnuts being made in a motor-driven doughnut machine in full view of the visitors. Upon entering the building visitors were directed upstairs to the office portion, where women visitors were presented with carnations.

The lighting of the new carhouse was very brilliant and apparently every possible facility has been installed to make convenient the maintenance and repair of cars. Visitors to the building found that much attention had been paid to convenient arrangement and to easy supervision, as practically all partitions are of clear glass, so that operations in any department can be easily supervised.

Saturday evening at 6.30 L. W. Heath, the general manager of the company, gave a dinner at the Lycoming to the presidents and secretaries of the Rotary, Kiwanis, Lions and Exchange Clubs, Newberry Progressive Association, Merchants' Association, officials of Williamsport and South Williamsport, members of the traction investigation committee, bankers and representatives of the press, and at this dinner Mr. Heath gave a short talk, which he termed "A Report of Stewardship."

He briefly related the real progress to date, since the report of the railway investigation committee was made to the City Council a year ago, and stated that the railway situation in Williamsport and the method followed in improving it, providing better service and facilities, had been termed by railway men "The Williamsport Experiment," because, as far as was known, no other railway had ever applied to the city in the same co-operative way as had the local company, asking that it be investigated by a committee of business men, and that the result of what was being done is being watched with much interest in a number of other cities. Facts and figures were given to show that the railway to date was ahead of the program required of it by the committee's report, which was adopted by the city, and that the company had deferred for a year the increase in fare for the reason that it wished to show the people of Williamsport that it was going to do all that was required of it.

George Frey of the J. G. Brill Company said that the new cars built by his company for the local railway were probably the most elaborate cars they had ever made for city service.

After dinner was over, the party was taken on a tour of inspection to the new carhouse and shops.

## "Eight-Foot Law" Reiterated in Brooklyn

Car cards bearing the direct warning from the traffic court against violation of the "8-ft. law" are being carried on both ends of the cars of the Brooklyn

Warning Signs on Brooklyn Cars

City Railroad and the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y. This poster was developed at a conference with representatives of the traffic court, the Police Department and the transportation companies in Brooklyn. It was suggested by Magistrate Francis A. McCloskey of Homicide Court and indorsed by railroad officials. In the same place usually occupied by theater advertisements, motorists following a trolley car see this court announcement, "Obey the Law. Do not pass within 8 ft. of standing car. Avoid jail or loss of license. Traffic Court." Police officials concurred in the idea and promised to conduct a campaign of enforcement. It was said that railways in Manhattan would likely adopt the idea, which took tangible form in Brooklyn on Feb. 21.

## Engineers Go Ahead with Plans for Chicago Subway

Completion of engineering plans, costs and specifications for a downtown subway in Chicago awaits only advice from the City Council, according to a recent announcement by R. F. Kelker, Jr., engineer for the local transportation committee of the City Council.

Upon instruction received from the City Council, Mr. Kelker, in company with other city engineers, has been constantly at work for the last ten weeks on a field survey of the plan recommended last August by the citizens' advisory subway commission for the construction of two subway routes under the Loop district; one a rapid transit tube under State Street between Chicago Avenue and Roosevelt Road and the other a low-level loop subway for street cars only under Washington, Michigan and Jackson Boulevards. Having recently completed this survey, upon which it is hoped the City Council will presently frame an ordinance, the engineers are now working on general specifications for any subway plan that may be adopted, especially the difficult rearrangement of sewers and public utility conduits which subway construction would make imperative.

Major Kelker is also studying the possibility of creating a mid-city elevated trunk line in the neighborhood of Ashland Avenue, connecting the Ravenswood and Englewood branches of the Chicago Rapid Transit system and assuring residents of the west side of the city direct north and south transportation without making it necessary to take a circuitous trip through the Loop district.

Mayor William E. Dever strongly advocates immediate construction of subways. He has indicated in recent speeches in his campaign for re-election that he will do all in his power to have a subway ordinance submitted to the voters at the judicial election next June.

## New York's Mayor Urges More Money for Subways

Doubt appeared to have been removed on March 3 that the Legislature of New York would pass the resolution to submit the proposed constitutional amendment empowering New York City to borrow $300,000,000 outside its debt limit to build new subways. Mayor Walker urged the passage of the resolution at the hearing the previous day, but he was no more specific than he has been in the past, merely repeating the 5-cent fare and other political shibboleths handed down from Hylan, the former Mayor.

Late on March 3 a movement devel-

oped to delay the submission of the amendment to the voters until 1928, which will be a Presidential election year. This was started by Senator John Knight, Republican leader of the upper house, who asked Attorney-General Albert Ottinger whether it would be legal to provide for the submission next year instead of at the November election this year.

The Attorney-General gave an informal opinion that the Legislature had the legal power to delay submission, the State Constitution providing that a proposed amendment might be submitted in the time and manner that the Legislature might direct.

## Attack on Minneapolis Regulatory Act

Should the Brooks-Coleman street railway regulatory act be repealed at the present Minnesota Legislature chaos would result. This was the opinion expressed by Charles B. Fowler, counsel for the Minneapolis Street Railway; Pierce Butler, Jr., counsel for the St. Paul City Railway, and Oscar Mitchell of the Duluth Street Railway, at a hearing before the Senate committee on legislation recently at the Capitol. Proponents of the repeal had their inning a week previously.

The Brooks-Coleman act was passed in 1921. Since then the electric railways of the state have been regulated by the Minnesota Railroad and Warehouse Commission as to issues of stocks and bonds and as to rates of fare.

At the previous meeting a special committee of the Minneapolis Civic and Commerce Association presented the following opposing resolution:

Minneapolis car service is second to none in the United States.

The act was passed after careful consideration by legislators, and citizens and civic organizations.

Before enactment the electric railway situation was constantly injected into politics.

Expense of reaching valuation figures to fix fares would be wasted by repeal.

Fare fixing should be left to disinterested arbitrators.

Since passage of the law differences between the Minneapolis City Council and the railway have been largely composed.

Repeal would lose all that has been gained by such harmony and improvement of service.

Chaos would prevail in the legal status of city and company by repeal.

The three railway attorneys said that repeal would not reinstate the old franchise even if they had not expired as in the case of Minneapolis in 1923. The attorneys for St. Paul and Duluth took the opposite view. Mr. Fowler said the Brooks-Coleman act extends local control over railways. The main object is to provide a workable, practical and equitable method for having a rate of fare determined from time to time as conditions change. The Council represents its constituents and cannot do otherwise. In the very nature of things it must be biased in favor of the citizens. He said further:

To such an extent has this view been adopted that there are 39 states which have public utilities commissions to which much more extensive powers are granted with reference to the regulation and control of utilities within cities than is given by the Brooks-Coleman act.

In case of repeal the company would try to get the highest rate it could. The battle would be on with the city over fares, extensions, improvements, etc. The situation would be worse than in 1921.

The St. Paul City Railway counsel held that repeal would make it impossible to refund $10,000,000 bonds in 1928 and the result would be receivership. The Duluth Railway counsel said a $3,000,000 bond issue to be refunded in 1930 would be in danger of finding no market.

Editorials were quoted from Twin Cities and Duluth newspapers opposing the repeal.

A decision is expected soon by the general legislation committee of the Senate.

## "Turn Backward, Oh, Time——"

WHILE in New York Mr. Lowry inspected the new invention of Van Depoele & Sprague, which is a horseless car. Motors are built into the floor of the car and by wire are connected with an overhead current which propels the car along a steel track without horses being necessary. Mr. Lowry said:

"The car isn't practical yet, but if the inventors ever do get it where it is usable, you can rest assured the system will be adopted for Minneapolis."

The above statement is part of a clipping taken from the Minneapolis *Journal* of Feb. 23, 1887, and included in a special edition of the *Journal* distributed at the fortieth anniversary of the Minneapolis Real Estate Board on Feb. 23 at the Hotel Radisson.

N. B.—Mr. Lowry has ceased to expand the horse lines, but each year renews his faith in the electric lines.

## Free Parking Space at North Shore Stations

Free parking space at stations for the automobiles of customers is the latest feature of service on the Chicago, North Shore & Milwaukee Railroad. This extra bit of service, started in connection with the railroad's Better Business Campaign, is expected to increase passenger traffic materially. On the Shore Line route parking space is provided at the Milwaukee, Racine, Kenosha and Ravinia stations. On the Skokie Valley route eleven stations provide this service. A special booklet, containing information about this latest innovation of North Shore Line service, has been prepared and is being distributed by station agents.

## Completion of First Hole of Moffat Tunnel

President Coolidge, by remote control, set off the blast which broke down the last barrier between the two bores of the preliminary work of the Moffat tunnel on Friday night, Feb. 18, at 8.10 o'clock mountain standard time. Elaborate ceremonies in honor of the event were staged in Denver, conducted by Governor Adams of Colorado and broadcast from radio station KOA of the General Electric Company in that city.

The Moffat tunnel, boring under the Continental Divide, will be 6.04 miles long, the second longest tunnel in the World. It will be 3 miles shorter than that of St. Gothard under the Alps. Its completion will mark the culmination of a heroic struggle for the construction of a transcontinental route through Colorado, running from Denver to Salt Lake City. It will open the western slope of the Rocky Mountains to all-year traffic, connecting in the west with Moffat's original railroad below the snow blockage line.

With the utilization of the proposed Dotsero cut-off, a 41-mile branch railroad to be built from the west portal of the tunnel, the distance from Glenwood Springs, on the west slope, to Denver, will be reduced from 343 to 173 miles. The railroad in the tunnel will be electrified, electric locomotives hauling the trains. The steam locomotives will have their fires banked and will be hauled through with the trains. Tunnel construction work was started in October, 1923.

*Wide World Photos*

**Governor Adams of Colorado Congratulates Mayor C. C. Nelson of Salt Lake City (Left) After Final Blast in Moffat Tunnel**

## Extracts of Governors' Messages Continued

A digest of the Governors' addresses to the Legislatures was started in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 26. Five more messages are now added. They are from the states of Rhode Island, Tennessee, Washington, Connecticut and Wisconsin.

### RHODE ISLAND

Aram J. Pothier, Governor, stated in his message to the Legislature that of late years there had been an increasing tendency on the part of the state to control the matter of the issuance of the bonds and stock of public utility corporations from the outset by giving to the regulating commission the power to pass upon the issue of securities of such corporations and to scrutinize the arrangement under which these are paid for. The results to be expected from it are, in the end, a great simplification of the problem of regulation, as under it the outstanding securities will gradually come to be, at least *prima facie*, the measure of the real investment devoted to the public service upon which it may ultimately be conceded a proper return is due. The purchaser of such securities would be assured that proper application was made of the funds derived from the issuance and public confidence would be created in the integrity of such securities.

The exercise of such authority by the Public Utilities Commission would make necessary the employment of expert engineers and accountants in order that its duties might be properly performed. Inasmuch as such regulation would largely inure to the benefit of the utility and the holders of its securities, it would appear proper that any such extraordinary expenses involved in reference to a particular issuance of securities be charged to the particular utility concerned. He therefore recommended to the General Assembly the passage of suitable legislation vesting in the Public Utilities Commission the power to regulate all issues of bonds and stocks of all public utility corporations in the state.

He recommended an increase in the gasoline tax from 1 cent to 2 cents per gallon, to go into effect on July 1, 1928. The Motor Vehicle Department, during the past year, has made an earnest effort to reduce the terrible toll of highway accidents.

### TENNESSEE

It is the plan of Gov. Austin Peay to continue during the next two years to build state highways. He opposed any increase in the gasoline tax, believing that 3 cents a gallon was enough tax to pay on gasoline. Further, because his state could build and complete its state system of highways on the present tax, it was generally a fine thing to maintain a lower tax. He referred to the report of the Commissioner of Highways and Public Works, which contained suggestions for the regulation of travel and traffic on the state highways. Parking automobiles on the traveled portions of these roads was causing many accidents resulting in loss of life and property.

On the subject of buses, he said that regulation had become necessary to safeguard the security and comfort of the public; that exclusive franchises to operate these bus lines would be sought. Such franchises, if granted, would be exceedingly valuable and could be sold for large sums. He believed that the state had a right to part of the receipts from all bus lines. He recommended that a commission be created and invested with proper authority to regulate schedules, fares and service on all buses and bus lines and such form of transportation, and to receive and collect a right percentage of all the receipts accruing from such use of the roads by these buses and bus lines, or in lieu thereof that an annual tax be levied and collected in keeping with the value of the franchises and rights that they are using, whether or not they be exclusive.

He recommended proper legislation on the distribution and price of gasoline. On the question of public utilities, he recommended the abolition of the Board of Public Utilities, which he claimed never functioned to the satisfaction of the people. He reiterated his thoughts on the subject which were expressed in opening the campaign for Governor a year ago.

He recommended the passage of a bill to simplify corporation laws so as to encourage the investment of foreign capital in the state, and to save the loss of fees and revenues which the state is now losing through the use of foreign charters to corporations whose business was largely domestic.

### WASHINGTON

Gov. Rolland H. Hartley reminded the state Legislature that he had previously expressed belief that the state was spending too much money for highways and had requested the reduction of motor vehicle license fees. He said he was still of the opinion that a smaller construction program could be carried on with better supervision, less cost and more satisfactory results to the general public.

### CONNECTICUT

In Connecticut the problems of motor vehicle regulation become each year more numerous and pressing. Governor Trumbull, in his message to the General Assembly, urged upon the Legislature the creation of a joint standing committee on motor vehicles which should have exclusive charge of the consideration of all proposed legislation dealing with these topics. He said that it must be recognized that transportation problems and regulations of the various forms of vehicular traffic are becoming each year more vital to the economic stability of the industries and specific conditions of the inhabitants of the state.

### WISCONSIN

Gov. Fred R. Zimmerman, in his message to the Wisconsin Legislature, has approved the segregation of the motor vehicle department, placed under a commissioner to be appointed by the Governor. He recommended that the property tax on all motor vehicles should be removed and an increased tax on gasoline should be substituted.

## Free Rides in Spokane

Two business institutions of Spokane, Wash., have announced the policy of free car rides. For the second time in six months, Culbertson's, a department store, chartered all inbound cars of the Spokane United Railways for its semi-annual assistant buyers' sale, paying the company direct for all passengers carried between 9 and 10 a.m. on the day of the sale. Thousands of shoppers took advantage of the offer.

The second institution was the Clemmer Theater, which has announced it will pay the fare of any patron at its theater who presents a transfer at the ticket office dated the day it was taken to the theater and presented between 11 a.m. the opening hour, and 1. p.m.

*Trolley Topics*, published by the Spokane United Railways, says that the department store and other houses realize how necessary it is to have reliable and responsible transportation always at hand.

## Old Richmond Franchise Relinquished

The Virginia Electric & Power Company, Richmond, Va., has formally surrendered all its old franchises and certified the agreement as to the surrender of its three toll viaducts within five years at the option of the city. The deeds of surrender were handed to City Clerk Alfred H. McDowell, who gave an official receipt for them. The form and style of execution of the documents were approved by the city attorney. When the city approved the so-called blanket traction franchise ordinance on Aug. 19, 1926, it was agreed that within six months the company would surrender the franchises whose privileges were included in the blanket agreement. The old franchises, all of which were operative until the blanket franchise was drawn to replace them, were acquired by the Richmond Passenger & Power Company, the Virginia Railway & Power Company and the Virginia Electric & Power Company as the local railway system in the city of Richmond developed.

## Missouri Line Receives Franchise

A franchise for the construction and operation of an electric passenger and freight line with its Clay County terminus in Liberty, Mo., and its Jackson County terminus in Kansas City, Mo., has been recently granted by the Clay County Circuit Court. The right of way is said to be under option. This project was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 26, page 393.

Articles of association have been granted by the Secretary of State to W. E. Winner and eleven business men and land owners of Liberty and its vicinity. Construction plans, according to Mr. Winner, call for a 150-ft. right-of-way in Clay County. The men associated with the project are planning a double track.

The road will run northeast to the Missouri River from the point contemplated, crossing on its own bridge

at a point approximately 3 miles south of Birmingham and a trifle to the west. Following the river east a short distance, the line would then branch off northeastward, passing just east of Birmingham. At a point approximately 3 miles from Liberty the plan contemplates a branch line east to the Atwood quarries.

## $314,000 Expenditure at Macon Suggested

Virtual rebuilding of the entire railway system of Macon, Ga., at an outlay of $314,000 is proposed in an exhaustive survey made by F. L. Butler, copies of which have been received by Mayor Wallace Miller and members of Council of Macon. Mr. Butler is vice-president of the Georgia Railway & Power Company, which is included in the system of the Georgia Power Company, which also controls the Macon property.

In return for this expenditure, a very large one for a city of the size of Macon, the company wants the gross receipt tax of 2 per cent imposed by the city lifted, the pavement assessment levy imposed by the city lifted, and a cash fare of 10 cents with three metal tokens for 25 cents.

In addition to the main points set forth above a multitude of minor changes are proposed and the public utilities committee of Council awaits a report from the city electrical engineer, Charles H. Humphreys, before giving the proposal consideration. At least several weeks must elapse before the city will be ready to take up the matter with the company for discussion.

## Bill Against Indiana Commission Killed

The Indiana Senate has killed the Cann bill, providing for the abolishment of the Indiana Public Service Commission. The vote was 30 to 17. Seventeen Senators entered the debate. Howard A. Cann, who introduced the measure, declared that the state administration defeated the bill. Many of the Senators who voted against the bill said in their arguments that any opposition to the present personnel of the commission or to its decisions was not a reason for abolishing the regulatory form of adjusting public utility relations with civic government.

Amendments to the Moorhead public utility bill in the Indiana Senate have been made as follows:

To bring holding companies, whether inside or outside the state, under the jurisdiction of the Public Service Commission.

To fix the value of utility property in all proceedings other than for rate-making purposes "as a going concern at the actual present fair value thereof," the idea being to exclude good will and other matters as part of the valuation.

To require utilities to exhaust every avenue of appeal through the state courts before taking an appeal from a decision of the commission to the federal court.

To make the commission on law conform with the Interstate Commerce Commission act as regards suspension of rates and reparations.

To provide for the appointment of members of the commission by the Governor. Members of the commission would be removable for cause by the Governor, or on verified petition filed by any taxpayer in the Circuit Court at Indianapolis, with right of appeal from that court to the State Supreme Court as in civil cases.

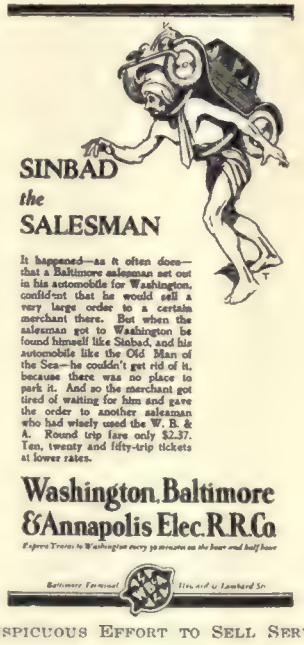
## Developments in Los Angeles Fare Problems

In a message to the City Council on the railway situation Mayor George E. Cryer, Los Angeles, Cal., recommends the suggestion of the Municipal League that Delos F. Wilcox, traction expert, be brought to the city to advise on the railway problem now at the front with the application of the Los Angeles Railway for an increase in fares from 5 to 7 cents. The Mayor believes that Mr. Wilcox should be able to "assist us in the pending rate case," as well as to report upon other phases of the railway situation.

Meanwhile the application of the Pacific Electric Railway for fare increases on its urban and interurban lines operating in southern California is scheduled for hearing before the California Railroad Commission on March 10. The city of Los Angeles has already appropriated funds to oppose the rate raise.

## Sinbad the Salesman in Bad

He couldn't get rid of it because there was no place to park and so the merchant got tired waiting for him and gave the order to another salesman. The latter was a wiser salesman because he had traveled from Baltimore




CONSPICUOUS EFFORT TO SELL SERVICE

to Washington on the Washington, Baltimore & Annapolis Electric Railroad. For him the round-trip fare was only $2.37, while the round-trip fare for the other salesman was too costly to be computed. The inability of Sinbad to rid himself of his burden, namely his automobile, is illustrated effectively in *Printers' Ink* of Feb. 3, 1927. In newspaper advertising the Washington, Baltimore & Annapolis Electric Railroad is meeting the problem presented by the motorized sales force.

The accompanying reproduction shows another conspicuous effort in the electric railways' campaign to urge the use of the electric line for transportation to the office, for shopping and to insure prompt attendance at the theater.

## News Notes

**Paving Question on Grand Rapids Ballot.**—The City Commission at Grand Rapids, Mich., has approved by unanimous vote the plan to place on the ballot at the primary election on March 7 the charter change which will allow the commission to eliminate the charge now assessed against the Grand Rapids Railway for paving between tracks.

**Fares in Annexed Region Reduced.**—The Lynchburg Traction & Light Company, Lynchburg, Va., has reduced car fares in the annexed territory to 5 cents. The company has charged 6 cents since March, 1922, and since annexation sought to prevent the city from cutting the extra cent out. This was done by application to the federal courts for an injunction, but the District Court and Circuit Court of Appeals held they had no jurisdiction.

**P. R. T. Released from Air Mail Contract.**—Cancellation of the air mail contract for the route between Philadelphia and Norfolk via Washington is announced by the Post Office Department, the Philadelphia Rapid Transit Air Service, the contractor, having requested a release. The service was operated primarily as a passenger carrying line during the Sesquicentennial Exposition and had been suspended for the winter.

**Wage Conferences in Augusta.**—Negotiations are in progress between the management and employees of the Augusta Railway & Electric Corporation, Augusta, Ga. It is said that though both parties are agreed upon the main questions at issue, the company is unwilling to accede to certain demands involving money concessions upon the alleged plea of financial inability to meet added obligations under present conditions. Under the existing contract failure to reach an amicable agreement calls for arbitration.

**Route Numbers for New Jersey Cars.**—Trolley cars of the Public Service Railway, Newark, N. J., operating in the Essex Division are to carry route numbers, in addition to other signs indicating destination. The Central line cars already have been so equipped, and other lines will follow. Public Service bus lines have carried route numbers for some time, routes being designated by even numbers. Trolleys will have odd numbers, and the bus and electric railway lines operating in the same territory will have, so far as possible, contiguous numbers.

**Rehearing on Permit Transfer Denied.**—The Public Service Commission on Feb. 17 denied the petition of the Schenectady Railway for a rehearing on the commission's order, dated Oct. 6 last, consenting to the transfer of the certificate for the operation of a bus line between Schenectady and Guilderland, N. Y., from John Coons to Bohl Brothers, on the ground that sufficient reason had not been advanced by the railway for a further hearing. Bohl Brothers Inc., operating under another certificate covering a line between

Albany and Altamont, commenced through travel between Albany and Schenectady after the certificate covering the Guilderland-Schenectady line had been transferred to them. Following this action by the commission, the Schenectady Railway alleged that Bohl Brothers were operating between Albany and Schenectady by way of Guilderland in competition with it.

**Expect Increased Revenues Since "Ride a Day" Urged.**—"A Ride a Day Will Make Them Pay" was the slogan of the Ride the Street Cars Week in Seattle, Wash., which extended from Feb. 20 to 27 and which was sponsored by the Seattle Municipal Street Railway. Practically every civic club in the city co-operated in an effort to help lift the burden of debt from the lines. The Owl Drug Company gave away car tokens to all customers with purchases of 50 cents or more. All of the daily newspapers, in editorials and front-page stories, extended aid in advertising the plan.

**Higher Fare in Johnson City.** — A 7-cent fare for Johnson City, Tenn., was announced recently by D. R. Shearer, vice-president and general manager of the Johnson City Traction Company, following approval of the new rate by the State Railroad and Public Utilities Commission. An appeal for aid was prompted by the continued decrease in traffic, the deterioration of the cars and need for repairs to the tracks. Mr. Shearer said that at the present time the indebtedness was about $30,000. If the people would co-operate, he said he would put a plan in effect calling for a ten-minute schedule throughout the system and eventually would install buses to points of the city which are not now reached by the street cars. Any added income is to be diverted to improving the physical property.

**Improvement Classes in Salt Lake City.** — The Utah Light & Traction Company, Salt Lake City, Utah, has started night classes for supervisors, carhouse foremen and employees in general, by means of which they will be enabled to increase their knowledge of several subjects, including mathematics, mechanical drawing, English and spelling. Two nights each week are devoted to these classes. No charge is made. A large number has enrolled.

**Higher Fare Approved.** — The Citizens Railway, Clarksville, Tenn., has been authorized by the Tennessee Railroad and Public Utilities Commission to increase its cash fare by 2 cents. The new fare will be 7 cents with a 6-cent book rate and 3 cents for children. The old fare provided a 2½-cent fare for children. The railway system, with a trackage of only 3½ miles and at present operating only three cars is a semi-civic project, the stock being owned by citizens who fifteen years ago bought the system when operation was about to be discontinued by the private owners.

**Express Service Discontinued.**—The Jacksonville Traction Company, Jacksonville, Fla., has served notice of the discontinuance of its express service on the Brentwood line. The operation of the express cars has been carried on for the past two months as an experiment.

# Recent Bus Developments

## Bus Proposal Rejected

### For Second Time Cincinnati Residents Vote Down Proposal to Replace Railway with Coaches

Two hundred and fifty citizens of Mount Lookout, a residential section of Cincinnati, Ohio, voted on Feb. 11 to refuse the offer of a four months trial of motor coach service to replace electric railway service. The proposal was made by Walter A. Draper, president of the Cincinnati Street Railway, after careful study of the transportation problem of that district and after many conferences with the special transportation committee of the Mount Lookout Business Men's Club.

The Cincinnati Street Railway is confronted with the necessity of reconstructing its tracks within a year or two on Delta Avenue, the route that serves Mount Lookout. Much had been said in conferences with the transportation committee about the feasibility of motor coach transportation, and it appeared that motor coach service might be more desirable to these people. The $175,000 necessary for new tracks would then be practically a loss. Work on the new tracks could not be started at once and the old tracks were already in rather poor condition.

It was proposed with the motor coach service to give a through line to the main business district of Cincinnati in both directions, whereas the railway furnishes through service only to the north. A transfer to Eastern Avenue at Delta is necessary if one wishes to go downtown, south on Delta. The rate of fare would remain the same as regular motor coach fare in Cincinnati.

In presenting the proposal to the people Mr. Draper said in part:

> In considering the suggestion I am especially desirous that it be understood that it is being made without any other motive than as outlined herein, and that is to give the people of Mount Lookout on Delta Avenue an opportunity to determine for themselves and by experience whether they prefer or can better be served by motor coaches or cars. Without trying motor coaches exclusively they cannot have the actual experience to be used as a basis for comparison. If they can best be served by motor coaches and prefer them after a trial, and if motor coaches are able to take the place of street cars in some communities, such as Mount Lookout, it would seem to me that it is desirable to find this out before expending the money and putting the new tracks in the street.
>
> It should be clearly understood that the matter is to be left to the people and that the temporary discontinuance of street cars should in every way be safeguarded so as to require the restoration of street cars in case your people should so desire.
>
> In conclusion I desire to say that this matter has been discussed with Edgar Dow Gilman, the Director of the Department of Public Utilities, and it is now being submitted to you with the approval of that department, the understanding being that the temporary operations proposed to be undertaken as a trial will be approved by the city if your people express themselves as desiring it to be done.

The real wishes of the people were expressed in the following motion:

> It is the sense of this meeting that we do not favor a substitution of motor coaches for street cars on Delta Avenue, even for a trial, but desire the street car service to be continued.

This is the second time the Cincinnati Street Railway has had a proposal to substitute motor coaches for railway service rejected in a thickly populated section. The other case was similar to this, except that the street paving was being renewed and the tracks were torn out. In that instance the company offered to substitute motor coach service for railway at once, or to have the center of the street left open and the sides paved while a trial of motor coach service took place. Both phases of the offer were rejected by the people in that district.

## Connecticut Commission Reversed in Bus Case

Judge Newell Jennings of the Superior Court, sitting at Hartford, Conn., recently rendered a decision setting aside and declaring void an order of the Public Utilities Commission which granted to the New England Transportation Company a certificate to operate a bus line between Waterbury and Hartford via Milldale, Southington, Farmington and West Hartford.

In its original application the New England Transportation Company, which is a subsidiary of the New York, New Haven & Hartford Railroad, requested the Public Utilities Commission for a certificate to operate a bus between Danbury and Hartford via Waterbury. This it did despite the fact that the Waterbury & Milldale Tramway operates an electric railway between Waterbury and Milldale, a third of the distance between Waterbury and Hartford, and operates a bus line in conjunction with its railway between Waterbury and Milldale for some period of time. It applied to the commission for an extension of its bus certificate from Milldale to Hartford via Southington, Plainville, Farmington and West Hartford. The railway produced evidence to show that public convenience and necessity demanded the operation of a bus over the route which was proposed by it.

After the evidence had been closed, the Transportation company amended its route so that it paralleled that of the tramway. Notwithstanding the fact that the tramway had produced the evidence, the commission passed an order granting the certificate to the Transportation company. From this order the tramway appealed to the Superior Court and was successful when Judge Jennings recently decided that the commission erred in granting the certificate.

The decision in this case is of particular interest because a ruling of the commission has not been reversed by the Superior Court for some time. The appeal of the tramway acts as a stay, so that the Transportation company has been unable to operate between the terminals of the route.

The Transportation company has now appealed to the Supreme Court of Errors of Connecticut.

## Worcester Consolidated Company Buys Lake Bus Lines

The Worcester Consolidated Street Railway, Worcester, Mass., has bought the Lake Bus Lines. Included in the transaction are seven buses, a large leased garage with a repair shop and the good will of the Lake Bus Lines, Inc. It is the first strictly "city" bus line bought by the railway and in a measure supplements the only other local bus lines operated by it.

When the Massachusetts Omnibus Company of Boston sent a fleet of eighteen buses to Worcester Mr. Carter, from whom the Worcester Consolidated Street Railway bought the Lake line, was in the trucking business. The bus company was forced out of business. Mr. Carter bought four of the buses for $1,600. He used them for a time to carry private parties, but finally established the Lake lines at the urgent plea of Lake district residents in Worcester. The Consolidated, in addition to its local routes, now operates buses to Marlboro, Clinton, Oakdale and Southbridge.

## Bus Capacity Tax in Dallas Questioned

A test of a city's right in Texas to levy and collect from street car systems operating buses for carrying passengers the same per passenger capacity tax levied on other buses used as common carriers is to be made in Dallas, Tex. A temporary injunction was granted recently restraining John H. Cullum, county tax collector, from levying and collecting the $4 per passenger capacity tax, in addition to the regular registration fee, on seven of 21 buses operated by the Dallas Railway & Terminal Company. This company operates the railway lines in Dallas and runs 21 passenger buses as feeders. The petition of the railway sets forth that Tax Collector Cullum was tendered the regular registration fee for these trucks operated as passenger-carrying buses, but that he refused to accept such fee without the additional $4 per passenger capacity fee. The plaintiff also is asking that a writ of mandamus be issued directing Mr. Cullum to accept the registration fee and issue a license for authority to operate during 1927.

## Holyoke Litigation Ends

The Holyoke Street Railway, Holyoke, Mass., has won a final and decisive victory over the appeal of the Interstate Buses Corporation, Hartford, Conn., for a rehearing of the case. The latter company has received notification from the United States Supreme Court that petition for a revival of the case has been finally denied. The final denial of the courts to hear an appeal will prevent the Interstate Buses Corporation from taking passengers between Springfield and Greenfield without the necessary licenses, which the company has been unable to secure.

The lines of the Holyoke Street Railway and Interstate Buses Corporation run parallel for a great distance between Springfield and Greenfield, Mass. The former company alleged illegal competition and sought to prevent the bus company from picking up passengers over any of this distance without first procuring licenses from the towns passed through.

The railway alleged that the bus company was acting in violation of a Massachusetts statute, while the Interstate company said the statute was unconstitutional. The trial a year ago was based on this argument and the result upheld the state of Massachusetts and its bus laws. The Interstate in its fight attempted to have an injunction issued to prevent officials from prosecuting bus drivers of the company. It succeeded in securing a temporary injunction in the state courts. Three judges of the United States District Court later ordered the bill dismissed. On an appeal the Supreme Court upheld the District Court.

## Petition on Framingham Bus Substitution Heard

The petition of Franklin T. Miller, receiver of the Boston & Worcester Street Railway, Framingham, Mass., in which he seeks to gain permission to supplant bus service for electric railway service over parts of the lines, was heard recently before Judge Carroll of the Supreme Court.

Roland W. Boyden, representing the bondholders, said that any discontinuance of electric railway service would injure the good will at a sale of the property if a reorganization is effected. Mr. Boyden brought out that plans for reorganization were temporarily held up awaiting the action of the Public Utilities Commission regarding the valuation of property. Just recently the commission decided that the property had a valuation of $2,900,000. There is a bond issue of $2,500,000.

Mr. Boyden's request for a postponement for a month to permit plans to be made for a reorganization was granted.

**New Line Authorized.**—The Public Service Commission granted on Jan. 18 the petition of the Utica Railway Co-ordinated Bus Lines, Inc., for a certificate for the operation of another bus line within the city of Utica, N. Y. The line is about 3 miles long.

**Certificate Granted.** — The Public Service Commission on Feb. 25 granted the petition of the Rochester Railways Co-ordinated Bus Lines, Inc., for a certificate for the operation of bus lines from the city of Rochester to Manitou Beach, Grandview Beach, Island Cottage and West Greece, N. Y.

**Bus Line Approved.**—The Public Service Commission granted the petition of the Olean, Bradford & Salamanca Bus Line, Inc., for permission to operate a bus line between Olean and Salamanca and between Olean and the New York and Pennsylvania state line on the road to Bradford, Pa. This company is a subsidiary of the Olean, Bradford & Salamanca Railway, which is now in receivership, and which desires to replace cars with buses.

**Bus Petition Granted.**—The Public Service Commission on Feb. 25 approved the petition of the County Transportation Company, Inc., for a certificate calling for the operation of bus lines in Port Chester and Rye. Trolley service has heretofore been given in this territory by the New York & Stamford Railway, which discontinued its lines in December, 1926. The bus company is a subsidiary of the railway. The routes authorized by the commission are more extensive than the electric railway lines.

**Abandonment of Unprofitable Service Favored.**—A resolution was adopted recently favoring the proposal of the Wisconsin Public Service Corporation to abandon its unprofitable railway service in Two Rivers, Wis., and interurban service between Manitowoc and Two Rivers. The discontinuance was favored on condition that adequate bus service be installed under some plan agreeable to both cities.

**Allowed to Run Bus Line.**—The Public Utilities Commission has granted permission to the Connecticut Company to operate a bus line between Newington Junction and Hartford via West Hartford, Quaker Lane and Capitol Avenue. The company is planning to start operations over the new line about April 1. The service to be maintained will be decided upon after a trial period. The rate of fare between Newington and Hartford will be 20 cents or two tokens with the privilege of transfer. At the start an hourly headway will be arranged. It is planned to add a bus during the rush periods as the business grows.

**Rush-Hour Service in Effect.**—The bus service installed on Washington's Birthday by the Twin City Motor Bus Company to supplement railway service into Bryn Mawr of the Minneapolis Street Railway, under a recent permit of the Minneapolis, Minn., Park Board and the State Railroad and Warehouse Commission, operates only in rush hours. The service is every twelve minutes between 7 and 9:30 a.m. and 3:18 and 8 p.m. It is accommodating workers and school children in a newly settled community beyond Bryn Mawr and the center of Minneapolis. The settlement is not sufficient to warrant continuous service. The bus line is the first operated by the Twin City Motor Bus Company over parkways in Minneapolis and the fourth opened for the railway within the city limits since last fall. The regular fare prevails with transfer privileges.

**Substitution by Bus Approved.**—The Public Service Commission on Feb. 25 granted the petition of the Westchester Street Transportation Company, Inc., for authority to substitute bus service for street cars on a portion of its route in Scarsdale, N. Y., and authorized the putting into effect of its tariff of rates on one day's notice. This company is a subsidiary of the Third Avenue Railway. On Dec. 9, 1926, the commission authorized the substitution of buses for street cars in White Plains with the approval of the city authorities. On Jan. 26, 1927, the village of Scarsdale approved the substitution of buses for street cars, which the commission approves in this order. The company proposes to operate its lines in White Plains and Scarsdale in one continuous route. The rate of fare authorized within the city of White Plains or in the village of Scarsdale is 10 cents and from Scarsdale to White Plains or return 15 cents.

# Financial and Corporate

## Georgia Consolidation Concluded

Consolidation of six Georgia public utility companies into the Georgia Power Company has been completed with the issuance of a charter to the new company by Secretary of State S. Guyt McLendon. The new company begins operation at once.

Simultaneously with the granting of the charter the Georgia Power Company acquires title to and control of properties formerly operated by the Athens Railway & Electric Company, Georgia Railway & Electric Company, Georgia Railway & Power Company, East Georgia Power Company, Rome Railway & Light Company and the constituent Georgia Power Company, the last named including properties formerly belonging to the Athens Gas Light & Fuel Company, Georgia Southern Power Company, Georgia Utilities Company and Milledgeville Lighting Company.

In addition to the above companies subsidiaries of the new company include the Central Georgia Power Company, Macon Railway & Light Company and Macon Gas Company, serving the Macon district; the Mutual Light & Water Company, operating in Brunswick, and a number of others.

Officers of the new company, as designated in the charter, are: H. M. Atkinson, chairman of the board; P. S. Arkwright, president; G. W. Brine, Charles G. Adsit, F. L. Butler and F. P. Cummings, vice-presidents; W. H. Wright, secretary; I. S. Mitchell, Jr., treasurer; F. R. Mitchell, assistant treasurer; B. T. Simpson, assistant secretary, and Stephen A. Dawley, assistant secretary. With the exception of Mr. Cummings and Mr. Dawley, who reside in New York, all of the officers are of Atlanta.

Merger of the companies brings to an end, so far as names are concerned, some of the oldest utility companies in Georgia. At the same time it increases their scope of service in the new company. One of the oldest of the companies is the Georgia Railway & Electric Company, which came into existence in 1902. While this company continued to exist until the present, all of its properties were leased to the Georgia Railway & Power Company, organized in October, 1911.

The organization of the latter company was the first real step in the development of Georgia's vast water power resources, as it immediately undertook the development of the Tallulah, Tugalo and Chattooga Rivers in North Georgia, and this year will complete the last of a chain of six water power plants on these rivers, which have a total capacity of 284,500 hp. of electrical energy.

In addition to serving Atlanta with electricity, gas, steam heat and transportation, the Georgia Railway & Power Company has rendered service to many other towns and cities in the state. It was the largest of the companies involved in the consolidation and also the largest in the state.

The Athens Railway & Electric Company came into existence in 1910, and besides furnishing Athens with electricity, gas and transportation service, it also developed three water-power sites adjacent to Athens.

The Rome Railway & Light Company was chartered in 1906 and furnished electric light and transportation service to Rome.

The Georgia Southern Power Company, which served Dublin and surrounding territory, was organized in 1925. The Milledgeville Lighting Company was chartered in 1924.

## St. Louis Sale Recommended

Special Master Williams in a report to the federal court on Feb. 24 recommended foreclosure sale of the properties of the United Railways, St. Louis, Mo., under a $9,790,000 issue of St. Louis Transit Company bonds in default since last October.

In this connection it has been indicated that United States District Judge Faris about March 20 will fix a date for the sale of the properties under foreclosure, as recommended by Mr. Williams. The court is also expected to fix the minimum or "upset" price at which the properties may be purchased. The foreclosure sale would quickly terminate the receivership, which began in April, 1919.

The recommendations of the special master was based on hearings for foreclosure under the mortgages securing the $9,790,000 St. Louis Transit Company 5s, the $4,500,000 St. Louis & Suburban general bonds and $3,000,000 of St. Louis & Meramec River Railway bonds. Interest on the Transit and the Suburban bonds has been in default since Oct. 1, 1926, and on the Meramec River bonds since Nov. 6, 1913. The bonds of the latter are held merely as collateral security for the Suburban generals. The Suburban general bonds cover that part of the car system taken over when the properties of the St. Louis & Suburban Railway were purchased by the St. Louis Transit Company.

The St. Louis Public Service Company has already been formed to acquire the United Railways properties at foreclosure sale. This company has been negotiating with city officials for a new franchise under the service-at-cost system, but no agreement has been reached on the rate of return to be allowed the company, nor on some tax questions, referred to elsewhere in this issue.

## Financing of Porto Rico Railways Purchase Arranged

For the purpose of acquiring the Porto Rico Railways, Ltd., Ponce, P. R., and for extending and improving controlled properties, offering is made of $3,000,000 of 6½ per cent 30-year gold debentures of the International Power Company, Ltd., a public utility holding and operating company, which controls properties in Bolivia, British Guiana, Newfoundland, Porto Rico, Salvador and Venezuela. The debentures are offered by Royal Securities Corporation, Ltd., and G. E. Barrett & Company at 100 and interest yielding 6½ per cent and mature March 1, 1957. They are redeemable on 30 days notice at 105 and interest, payable at the rate of $4.86⅔ to £1.

## Purchase in Norfolk Arranged

The stockholders of the Virginia Electric & Power Company, Richmond, Va., a subsidiary of the Engineers Public Service Company, have voted favorably on the proposition to acquire the Norfolk Railway & Light Company, which is now operated by the Virginia Electric & Power Company under a 99-year lease entered into June, 1906. The Virginia Electric Company will acquire the capital stock of the Norfolk company on a basis of $33 a share in cash or one share 6 per cent cumulative preferred stock and $9 cash for each three shares of the latter. The Virginia company already owns 62,400 shares of the 66,000 shares outstanding of the Norfolk company.

## Seattle Tax Decision Stands

The decision of the lower courts that the city of Seattle, Wash., must pay the Puget Sound Power & Light Company $545,370 to reimburse the company for taxes paid on the railway lines sold by the company to the city in 1919, together with interest, will stand. The United States Supreme Court on Feb. 28 refused to grant a writ of certiorari to review the case. Each side had appealed, the company from a decision by the Court of Circuit Appeals, which modified the decree of the District Court so as to provide payment from a special fund, and the city from the entire order. In a decision some months ago the Supreme Court held in a related case that the contract by which the company sold the street railway to the city was binding upon the city to pay the taxes for the year in which the sale was made.

## Local Company Not Interested in Washington Interurban

The Washington Railway & Electric Company, Washington, D. C., has rejected a proposal that it take over and operate the Washington-Virginia Railway, now in the hands of receivers. The proposition which the Washington company was considering did not involve outright purchase of the holdings of the Washington-Virginia line, but called for a plan of joint control with certain Virginia interests, it was learned. Recently an announcement was made by the receivers that the holdings of the interurban would be sold at public auction.

The company operates electric cars from Twelfth Street and Pennsylvania Avenue over one double-track line to Arlington Junction, Va., where separate lines diverge to Alexandria and Mount Vernon and to Clarendon, Falls Church and Fairfax. The railroad also operates a bus line over the Lee Highway to Fairfax.

# Twin City Expands

### Net Income in Minneapolis and St. Paul in 1926 Shows Gain—Taxicab Control

The total operating revenue of the Twin City Rapid Transit Company and its subsidiary companies of Minneapolis and St. Paul, Minn., for the year ended Dec. 31, 1926, was $13,945,266, an increase of $1,566,914 as compared with the year previous. Total operating expenses were $10,322,488, compared with $9,234,088 for 1925. These facts were included in the annual statement of Horace Lowry, president of the company, to the stockholders.

CONSOLIDATED INCOME STATEMENT OF THE TWIN CITY RAPID TRANSIT COMPANY*

| | 1926 | 1925 |
|---|---|---|
| Revenue from transportation | $13,825,851 | $12,269,156 |
| Revenue from other operations | 119,415 | 109,196 |
| Total operating revenue | $13,945,266 | $12,378,352 |
| Way and structures | $1,201,892 | $1,215,796 |
| Equipment | 1,106,303 | 1,129,065 |
| Power | 1,198,256 | 1,270,698 |
| Conducting transportation | 4,475,622 | 4,391,692 |
| Traffic | 46,492 | 36,233 |
| General and miscellaneous | 1,217,687 | 1,248,919 |
| Transportation for investment—Credit | *39,544* | *58,317* |
| Motor bus expense | 1,115,778 | ..... |
| Total operating expenses | $10,322,488 | $9,234,088 |
| Net operating revenue | $3,622,778 | $3,144,263 |
| Taxes assignable to operation | 1,229,115 | 1,291,137 |
| Operating income | $2,393,662 | $1,853,125 |
| Income from unfunded securities and accounts | $50,199 | $73,045 |
| Miscellaneous income | 6,298 | 49,666 |
| Net income miscellaneous physical property | ..... | 61,918 |
| Total non-operating income | $56,498 | $184,631 |
| Gross income | $2,450,161 | $2,037,757 |
| Rent for leased roads | $3,000 | $3,000 |
| Interest on funded debt | 995,520 | 988,954 |
| Interest on unfunded debt | 5,887 | ..... |
| Miscellaneous debits | 7,311 | 8,375 |
| Net loss miscellaneous physical property | 1,636 | ..... |
| Total deductions from gross income | $1,013,355 | $1,000,329 |
| Net income transferred to profit and loss | $1,436,805 | $1,037,427 |

*The income statement for 1926 includes the operations of the Twin City Motor Bus Company.

The net earnings of the company's buses for the year 1926 were small because complete control and operation of all the bus lines operating between the cities of Minneapolis and St. Paul and local lines was not acquired until during the early part of 1926 and it required some months to obtain the authority necessary to consolidate operations on an efficient basis. The report stated that the management was satisfied that the operation of the bus properties would earn a much larger return during 1927.

During the latter part of 1926 a prominent Minneapolis investment house secured control of practically all of the taxicab companies operating in Minneapolis and St. Paul, as well as some outside points in the state, and was about to make an offering of the stock of the consolidated taxicab company. The railway management recognized that if this stock became scattered at the time it would be impossible for the company to enter that field of transportation in the future and for that reason, on Jan. 4, 1927, acquired a controlling interest in the taxicab combination. Mr. Lowry said that in view of the constantly increasing use of the motor-driven vehicle it seemed imperative that the Twin City Rapid Transit Company should engage, as far as possible, in all forms of public transportation, and inasmuch as it was already operating the local and intercity bus lines, it was only logical that the operation of the taxicab business should also be taken over.

The unification of the various competing cab companies will increase materially public transportation by the elimination of congestion, according to the management, which is satisfied that the Twin City Rapid Transit Company will be paid a fair return on its investment which has been made by it in the taxicab business.

During 1926 the company earned sufficient to pay regular quarterly dividends at the rate of 7 per cent per annum on its preferred stock and paid four quarterly dividends of 1¾ per cent on the common stock, which is 1 per cent more for the year than was paid during 1925.

Mr. Lowry referred to the previous report, which called attention to the provision in the commission's order fixing the rate of fare in the city of St. Paul. He referred to the general election in November on the city charter amendments for St. Paul and their non-passage by the voters, because of the fact, he said, that any voter not voting on the question at a general election had the effect of counting as a vote against the measure. He said that the management was now urging the St. Paul City Council to call a special election at which the city charter amendments only would be submitted. If the city did not take this action the company would be forced to seek other relief.

PROFIT AND LOSS ACCOUNTS OF THE TWIN CITY RAPID TRANSIT COMPANY*

| | | |
|---|---|---|
| Balance Jan. 1, 1926 | | $1,866,347 |
| Additions for the year | | 1,436,805 |
| Net adjustments | $30,247 | |
| Dividends on preferred stock | 210,000 | |
| Dividends on common stock | 1,100,000 | |
| Balance carried forward | 1,962,905 | |
| | $3,303,152 | $3,303,152 |

*The consolidated statements this year include the accounts of the Twin City Motor Bus Company.

CONSOLIDATED STATISTICAL REPORT OF THE TWIN CITY RAPID TRANSIT COMPANY

| | 1926 | 1925 |
|---|---|---|
| Total revenue | $14,001,764 | $12,562,983 |
| Total operating expense | $10,322,488 | $9,234,088 |
| Net revenue | $3,679,276 | $3,328,895 |
| Revenue passengers carried | 190,826,784 | 200,783,106 |
| Transfers redeemed | 69,248,145 | 72,814,559 |
| Operating, per cent of revenue, taxes included | 82.50 | 83.78 |

STATISTICAL STATEMENT OF THE TWIN CITY RAPID TRANSIT COMPANY

| | |
|---|---|
| Track-miles, all track reduced to single track | 504.53 |
| Total car-miles operated | 29,297,108 |
| Gross passenger car revenue | $12,603,215.75 |
| Revenue passengers carried | 185,711,950 |
| Transfer passengers carried | 68,917,932 |
| Revenue passengers per car-mile | 6.34 |
| Total passengers per car-mile | 8.69 |

## Stark Electric After Canton Lines

Negotiations for control of the city railway lines at Canton, Ohio, have been opened by officials of the Stark Electric Railroad, Alliance, Ohio, with offices of the Northern Ohio Power Company, which operates the Canton lines. The franchise of the Northern Ohio Power is about to expire. Launching plans for new operating rights that company asked the Council at Canton for an exclusive grant.

If this deal is consummated the Stark Electric will double its mileage. At present the company owns 30 miles of interurban track from Canton to Salem. The Canton system consists of 30 miles of track.

There have been several conferences between officials of the two companies, but no definite action has yet been taken. The outcome, according to E. W. Sweezy, general manager of the Alliance company, depends on the degree to which the Canton City Council cooperates with the Stark Electric in the proposal. Action in taking over the Canton city lines will not affect present interurban service to Canton and other near-by cities by the Northern Ohio Power Company. That company will continue to operate the intercity lines, surrendering only the city routes to the Stark.

## Seattle & Rainier Property Tax Discussed

A resolution urging the City Council of Seattle, Wash., to enforce collection of a delinquent franchise tax owed by the Seattle & Rainier Valley Railway has been shelved by the Council utilities committee. The resolution, submitted by the Commonwealth Club, which is fighting the proposed purchase of the valley line by the city, states that over a period of years the railway is now in arrears approximately $75,000 in taxes. It was pointed out that the City Council, in closing the contract, to be voted on March 8, allowed in the price for the tax.

A new plan for collection by the city of the tax due has been proposed by Councilman Oliver T. Erickson and has been drafted in an ordinance by T. J. L. Kennedy for presentation to the City Council. Under present arrangements, the line exacts a 10-cent cash fare from patrons desiring a transfer to the municipal car lines. Of this 10 cents, half goes to the Seattle Municipal Railway and half to the company. Mr. Erickson proposes that the Rainier line reduce its fare, with privilege of transfer to the city-owned line, to 8½ cents, with the understanding that the city will credit the system with 1⅞ cents on each transfer accepted from the company's line, the amounts so credited to apply on franchise debt owed the city.

## Wichita Property Reported Sold

Reports have it that the railway and bus lines run by the Wichita Railroad & Light Company, operating in Wichita, Kan., are to be taken over early in March by the Wichita Transportation Company. The latter corporation, it is said, is headed by Howard V. Wheeler, Robert B. Campbell and R. C. Clevenger, local capitalists.

**Three Miles of Line Sold.**—The board of directors of the Fort Loramie Railway, Fort Loramie, Ohio, and officers of the Western Ohio Traction Company recently completed the sale of 3 miles of railway line to the Western Ohio Traction Company of Lima. The latter company is now in possession of the holdings. The line was built in 1911 by the citizens of the section from Fort Loramie to Minister.

**More Passengers Carried.** — During the fiscal year ended Jan. 31, 1927, the Chicago Surface Lines, Chicago, Ill., carried 1,574,969,802 passengers, against 1,518,510,661 in the previous fiscal year, or an increase of 56,459,141 rides. Traffic handling facilities during 1926 were increased with the addition of 100 new cars and more than 99 per cent of the 3,639 cars now owned by the system are in service. October, 1926, marked the month of largest traffic for the system, when 135,878,579 passengers were carried. This exceeds by 2,929,063 rides the previous high monthly record made in December, 1925.

**Rental Payment Declared on Manhattan Stock.**—The regular quarterly dividend rental of $1.25 a share on stock of the Manhattan Railway is announced subject to the plan of readjustment by directors of the Interborough Rapid Transit Company, New York, which controls the former by lease.

**Equipment Being Scrapped.**—Scrapping of local railway and interurban equipment of the Ohio Service Company, Coshocton, has been started in Cambridge, Ohio. The work is being done by the E. P. Gaynor Company of Wheeling, W. Va. The company suspended its railway service between Cambridge and Pleasant City on Feb. 1. Bus service has been started in Cambridge and to points south, which had been served by the interurban line.

**B.-M. T. Bond Rise in Effect.**—The increased price for 6 per cent bonds of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., on sale by the War Finance Corporation went into effect on Feb. 15. Of an original offering of $18,199,200, the corporation has $10,262,000 unsold, the same total as on Feb. 3, when the increase in price was announced. The bonds are now offered at par and accrued interest against the price of 99½ and interest asked when the securities were first put on sale.

**New Financing Arranged.** — Day & Zimmermann, Inc., announce that the Southern Ohio Public Service Company, Zanesville, Ohio, has completed arrangements with Harrison, Smith & Company and Howes, Snow & Bertles, Inc., for new financing. Within the next few days, $2,100,000 first mortgage bonds will be offered, from the proceeds of which the company will pay off $690,750 first and refunding mortgage 6 per cent bonds of Southern Ohio Public Service Company. These will be called and redeemed on or about April 15, at 105, with accrued interest. The company is also paying off at par March 1 $1,000,000 Zanesville Railway Light & Power Company 6 per cent bonds. The Southern Ohio Public Service Company is the successor to the Columbus, Newark & Zanesville Electric Railway.

# Legal Notes

ALABAMA — *Highest Degree of Care Must Surround Passengers.*

In a suit by a passenger who was thrown from the steps of a trolley car, as she was alighting therefrom, to the pavement, which was muddy and rough and which had been torn up by the defendant, in preparation of its resurfacing, the court charged that the duty of the railway was to exercise the highest degree of care and provide reasonably safe and convenient places for their passengers to ride, and see that no danger befalls them in and about the duty of their agents in carrying passengers on their cars. [Birmingham Elec. Co. vs. Sheppard, 110 Southern, 604.]

CALIFORNIA — *The Automobile Driver Is Not Without Responsibility.*

Plaintiff who was injured was a passenger in an auto, driven by her son, which was struck by a trolley car as it crossed the tracks. There was proof that the auto had been proceeding at a speed from 20 to 40 miles an hour; that the approach to the tracks was somewhat obstructed, but that the car could be seen at a distance more than 200 ft. west of the crossing; that the car bell was rung for a considerable distance from the crossing, and when about 50 to 60 ft. from the crossing the operator saw the auto for the first time about 6 to 8 ft. from the tracks. It was held that the last clear chance doctrine was only applicable to a defendant who actually perceived danger of plaintiff in time to avoid the accident by exercise of due diligence and it could not be held liable on the theory that it should have discovered the peril. [Chappel vs. San Diego & A. Ry., 251 Pac., 321.]

KENTUCKY—*Window Sash Falling on Passenger's Arm Not Necessarily Due to Company Negligence.*

Appellant's elbow had been resting on the window sash and the window fell, injuring his elbow. The contention was that the sash which fell was under the exclusive control of the carrier, and since window sashes, if in good order and properly fastened, do not fall, there arose a presumption of negligence. The proofs failed in this respect. The court took notice that window sashes are often raised and lowered by passengers acting independently and therefore the doctrine of *res ipsa loquitur* does not apply. [York vs. Cincinnati N. O. & T. P. Ry., 288 S.W., 750.]

MISSOURI — *Humanitarian Doctrine Held Inapplicable to Pedestrian Hit by Rear of Car.*

A person standing too near the track when a car rounded a curve was struck by the rear end. The motorman could not know the pedestrian would not step back to avoid the end of the car, especially as he had to look forward to avoid traffic. To recover under the humanitarian doctrine, the plaintiff must be seen in a position of imminent danger immediately impending, actually or constructively known to the defendant, and he must then fail to exercise ordinary care (proportionate to the calls of that danger), to avoid injury to the plaintiff. [Siegel vs. Wells, 287 Southwest. Rep., 775.]

MISSOURI—*Boy Climbing Tree Injured by Charged Guy Wire.*

A boy 13 years old, climbing a shade tree in a parkway, came into contact with a guy wire, originally installed by a telephone company, against which two sagging live wires of a power company had come in contact. The power company was held responsible. [Shannon vs. Kansas City L. & P. Co., 287 Southwest. Rep., 1031.]

NEW JERSEY—*Bus Drivers Must Not Turn Without Warning.*

A driver of a bus suddenly and without warning slowed down and turned to the left, crossing the entire width of the road. Plaintiff, who was following the bus in his auto, was forced off the road into a ditch, damaging his auto and injuring passengers. The court held that the jury was justified in finding negligence on the part of the bus driver. [Winter vs. No. Jersey Bus Co., 135 Atl., 473.]

NEW YORK.—*Sale of Bus Franchises in Cities of the Second Class.*

A statute requires franchises in cities of the second class to be sold at public auction to the highest bidder and provides regulations as to the giving of security, etc. The city of Yonkers offered certain bus franchises for sale, but reserved the right to reject any and all bids if not reasonably satisfied as to "the good faith, responsibility and legal capacity of the bidder or bidders." This clause was held not in accordance with the statute and tending to discourage bidders, hence would make the sale illegal. The ordinance also required the bidder to accept only a portion of a route if any such portion was considered a public convenience and necessity by the Public Service Commission. This also was considered illegal by the courts as it required the bidder to accept a franchise he did not bid for and which the common council did not sell. The proper course would be that if the route approved by the commission was materially different from that sold, the bidder should not be compelled or permitted to accept it. A provision in the ordinance requiring the bidder to connect with stations on a subway were held valid as they did not make the franchise indefinite and uncertain. [Yonkers R. vs. City of Yonkers, 218 New York Supp., 103.]

NEW YORK.—*State Controls Rapid Transit in Cities Unless It Has Divested Itself of that Power.*

An attempt was made to hold a city referendum by which the electorate of New York City might instruct the Board of Estimate as to its duty on rapid transit policies. On the plea of a citizen and elector, the City Board of Elections was required to omit from the ballot all reference to this matter. The State Court of Appeals held that the plan proposed was an attempt to

supersede the State legislature and to take from the Board of Estimate certain powers and duties which had been conferred on it by state legislation. The plan also proposed to take away powers which the state had confided to the Public Service Commission. In the matter of rapid transit regulation, the cities of the state have not been fully emancipated from the power of the legislature. For these and other reasons given in its decision, a mandamus was granted. [McCabe vs. Vorhis et al., 153 Northeast. Rep., 849.]

NEW YORK—*Autoist Thought He Saw Red When That Was Impossible.*

A verdict was recovered as a result of a collision of a car and auto. One witness testified that as the car passed him it had a red headlight on it. All other proofs submitted were that the car was in proper operating condition; that a red headlight could only be shown as a headlight when the operator turned the so-called reverse lever in neutral position, in which case power could not be so transmitted to propel the car in either direction. The verdict was set aside, as against the weight of the evidence. [Baldwin vs. International Ry., 218 N. Y. Supp., 599.]

OHIO—*Attempt by Bus Operators to Preserve Individual Identity but Operate as a Unit.*

The Public Utilities Commission had issued certificates for the operation of buses to certain individuals along a state highway, in competition to the service furnished by the petitioner. An application was made by the petitioner to revoke the certificates on the ground that the holders thereof were operating as a partnership under the name of Red Star Transportation Company and that they had obtained the certificates of convenience and necessity by representing themselves to be engaged in operating as individuals when they were in fact a partnership and that they had renounced their certificates by operating as a partnership. The proof showed that the individuals had employed a common manager, had a joint schedule, shared certain expenses and purchased certain equipment from common funds. It was held that unless the evidence also shows that such operators so taking the profits shared them not only as principals in a joint business, but that each had an express or implied authority to bind the other as principal and agent, the relief played for will not be granted. [So. Ohio P. S. Co. vs. P. U. Commission of Ohio, 154 N. E., 365.]

WASHINGTON — *Certificate Properly Withheld from Bus Company, Even Though Promising Through Service.*

The Department of Public Works properly denied the application for a certificate for operation of through bus service between two towns where existing bus service required two transfers. However, in each of these two cases the transfers were made in the same bus station, through tickets were sold and no complaint had been filed that this service was inadequate or insufficient for the public need. [State vs. Department of Public Works et al., 250 Pacific Rep., 1088.]

# Personal Items

## Del A. Smith General Manager at Detroit

**Official Who Has Been Acting Manager of Municipal Railway Is Named to Succeed H. U. Wallace**

Del A. Smith has been named general manager of the Detroit Department of Street Railways, Detroit, Mich., by the Street Railway Commission. He was made assistant general manager of the municipal system on Dec. 15, last, and became acting general manager on Jan. 1, when the resignation of Col. H. U. Wallace, former general manager, became effective.

During the absences of Col. Wallace last year, Mr. Smith had active charge of the municipal system and demonstrated his ability and his knowledge of street railway operations. His former appointment as assistant general manager filled a vacancy in that office which had existed after the resignation of H. M. Gould.

D. A. Smith

Mr. Smith has worked up through the ranks in various positions from conductor in the interurban service.

His electric railway experience began in 1905 when he started as conductor on the Jackson division of the Detroit United Railway, the Detroit, Ypsilanti, Ann Arbor and Jackson line. Prior to that he had been in the train service of the Chicago, Milwaukee & St. Paul Railroad. He was made carhouse foreman with the Detroit United lines in 1907. From that position he was promoted successively to assistant division superintendent in 1911, night superintendent in 1916, supervisor of fare collections in 1918 and division superintendent in 1919.

On May 15, 1922, he was transferred to the Department of Street Railways with the city lines when they were taken over by the city from the Detroit United Railway. He was made assistant superintendent of transportation in July, 1922, and superintendent of operation on Dec. 1, 1924. His next promotion was to general superintendent, Nov. 9, 1926, which position he held until he was made assistant general manager.

Mr. Smith's appointment as general manager was made by Street Railway Commissioners John J. Barlum and H. H. Esselstyn. The third member of the commission, G. Ogden Ellis, is making a world tour, but it was announced that Mr. Smith's appointment had his full approval. The salary of the new general manager is $12,000 a year.

Following the appointment several improvements and extensions of the municipal lines suggested by Mr. Smith were approved by the commissioners. The estimated cost of the extensions totals $280,000 and work will start as soon as weather permits. All the improvements and extensions are to be financed out of the revenues received from the lines. It was also announced by Mr. Smith that the Detroit Municipal Railway has begun the rehabilitation of about 1,000 cars, the work being done in the Highland Park shops. It is planned to continue this work at the rate of about 100 cars a month.

Mr. Smith's appointment has been very highly approved by his associates and other employees of the municipal system, whose interests he has at heart and whose problems he understands by virtue of his past practical experience. His selection was also pleasing to city officials in departments with which he has come in contact and co-operated during his long service with the street railway.

## Other Changes in Stone & Webster Personnel

In furtherance of recent changes in the personnel of the Stone & Webster management announcement has been made of the following assignments:

George H. Clifford, formerly district manager of the companies located in the southwestern district, has been appointed division manager in charge of companies located in the southwestern district, the Virginia Electric & Power Company and subsidiaries and the northern district properties of Eastern Texas Electric Company (Delaware corporation). Mr. Clifford's headquarters will be in the Boston office beginning April 1.

Walter H. Burke, formerly manager of the Northern Texas Traction Company and Tarrant County Traction Company, has been appointed district manager of the companies in the southwestern district, comprising the properties located in Texas, Louisiana, New Mexico and Mexico. After March 15 Mr. Burke will be located at Houston, Texas.

Alfred F. Townsend, formerly manager of the Florida Motor Lines, Inc., and its affiliated companies and vice-president of Florida Motor Lines, Inc., has been appointed manager of the Northern Texas Traction Company and Tarrant County Traction Company.

Philip M. Wentworth, formerly man-

ager of Cape Breton Electric Company, Ltd., has been appointed manager of Florida Motor Lines, Inc., and its affiliated companies, and elected vice-president of Florida Motor Lines, Inc.

Leon E. Seekins, formerly assistant to the manager of the Lowell Electric Light Corporation, has been appointed manager of the Cape Breton Electric Company, Ltd.

Luke C. Bradley, formerly president of the Virginia Electric & Power Company, assumed his new duties as president of the Rhode Island Public Service Company on Feb. 20.

William E. Wood is now president of the Virginia Electric & Power Company.

The two last-named changes were announced in the ELECTRIC RAILWAY JOURNAL issue of Feb. 12, page 313.

## Los Angeles Superintendents Exchange Positions

Ernest R. Dye, superintendent at Division 3 of the Los Angeles Railway, Los Angeles, Cal., and George E. Ferguson, superintendent at Division 5, exchanged positions on Feb. 15.

Superintendent Dye went to the company in 1899, serving as a conductor out of Division 1, and was later transferred to Division 5. He resigned from the service in February, 1902, but was re-employed as conductor at Division 1 in August, 1903. In August, 1919, he became extra student instructor at Division 5, regular instructor in February, 1920, and was made superintendent of Division 3 in February, 1921.

Superintendent Ferguson entered the service of the company in October, 1905, as conductor out of Division 2. He resigned in April, 1912, and was re-employed a year later as motorman. In February, 1914, he was made extra dispatcher, and regular dispatcher in June, 1917. About three years later he entered the schedule department, was made special representative of the superintendent of operation in April, 1921, acting division superintendent of Division 5 in May, 1924, and regular superintendent of that division in January, 1925.

**Neal Brewster** was nominated by Governor Smith, and his name sent on Feb. 28 to the Senate for confirmation as a member of the Public Service Commission, to fill the vacancy caused by the expiration of the term of Charles Van Voorhis. Mr. Brewster was born at Weedsport, Cayuga County, N. Y., Jan. 30, 1879. He was graduated from Syracuse University in 1902 and was admitted to the bar the same year. Since that time he has been engaged in the practice of law in Syracuse, being a member of the law firm of Lee, Brewster & Johnson. He was Collector of Internal Revenue at Syracuse from 1915 to 1920 and City Comptroller of Syracuse from 1922 to 1926.

**Sir J. Henry Lamperd**, traffic expert of Melbourne, Australia, and head of the traffic system there, is on a visit to the United States to study traffic regulation. He arrived in Philadelphia recently for a brief study of Philadelphia's Traffic Bureau. He intends to survey conditions in other large American cities.

## Richmond's New President

### "Will" Wood Has Been with Stone & Webster Twenty Years in Many Capacities

Just twenty years ago a youth fresh from algebraic tussles at the Georgia Institute of Technology entered the already famous office of Stone & Webster at Boston to match his ingratiating South Carolinian accent against the more customary twang of the resident Yankees. It was "Will" Wood, and "Will" Wood it has remained to this day, although the more formal cognomen of "W. E. Wood" has been gracing more and more important documents with the passing years.

To be "cabined, cribbed, confined" to an office stool was not to young Wood's liking. After a year in Boston, he was transferred to Jacksonville to go through a realistic course of nuts to soup, viz., from the nuts on the controller to the superintendency of the Jacksonville Traction Company in the period 1907-1912.

Rising Stone & Webster men appreciate the adage that "a rolling stone gathers no moss," barnacles or other impedimenta toward an unclogged judgment. In 1916 "Will" Wood made his first shift by going to Houston as general superintendent. A little later he learned something of the noble width of Texas in becoming superintendent of the El Paso Electric Company, but in 1918 he returned as a neighbor to Houston in becoming local manager of the Galveston Electric Company. Two years later saw him manager of the Houston Electric Company and the Galveston-Houston Electric Railway.

W. E. Wood

#### UNDER MR. BRADLEY'S EYE

In these Texan years the ability, sincerity and likableness of "Will" Wood had been noted at first hand by the keen, kindly eyes of Luke C. Bradley, manager of the southwestern district of Stone & Webster. So when that firm took over the Virginia Railway (now Electric) & Power Company, with Mr. Bradley as president of the new concern, it was "Will" Wood who was invited to become ranking vice-president.

These two men, with other able companions brought up from Texas, took the reins at Richmond on July 1, 1925. Within the next year and a half the brilliant results accomplished there in better public relations led to a flattering offer to Mr. Bradley to accept the presidency of the Rhode Island Public Service Company, Providence, R. I. With twenty years service in the Stone & Webster organization, "Will" Wood, in February, 1927, had become president of one of its largest properties. Thus, the bare outline of achievement.

As "Will" Wood toiled upward, he never forgot to help his fellow-workers on or off the property. The records show that almost from the first he was an eager worker in territorial associations for mutual service. In 1925, his last year in Texas, he was elected president of the Southwestern Public Service Association. Perhaps he treasures even more than this honor from fellow-craftsmen the warm-hearted message which a group of big Houston men spread on the parchment, when he left for Virginia, to let him know he was loved as a man and respected as a useful citizen whose place in community affairs would not be easily filled.

As for the utility men of the Old Dominion, they waited no longer than the first convention to which Mr. Wood was a delegate to make him their president.

"How do they do it?" is the question always asked about men who get there. No copybook maxims will be quoted about "Will" Wood, but let this comment of a co-worker suffice: "He's so square and good-natured that you just can't get mad at him."

# Obituary

**Charles Sidney Baxter** died recently at his winter home in Miami, Fla. He was in his 60th year. He was admitted to the bar in 1895 and for some years was in charge of the law department of the Boston Elevated Railway, Boston, Mass. He was Mayor of Medford, Mass., for four years and took an active part in many political campaigns.

**Edward Carpenter Wood**, president of the Mica Insulator Company of New York City, Chicago and Schenectady, N. Y., died on Feb. 17 in New York. Mr. Wood was a pioneer in the mica insulation industry and played an important part in the development of "Micanite," which was put on the market by the Mica Insulator Company in 1893 and of which the company has been the sole manufacturer ever since. Mr. Wood had been identified with the Mica Insulator Company since its inception in 1893.

**Edwin Samuel Ely**, consulting engineer for the Virginia Electric & Power Company, now under Stone & Webster management, died on Jan. 16 at Norfolk, Va. He had rendered a truly valuable service to his company, and, after all, a service in favor of the community. Through the 25 years that he was associated with the system and its people he was always to be found the same —a dealer in kindliness and fair play toward his friends and business associates and a clean influence for good throughout the organization.

# Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

## Central Western Roads Go Ahead

**Expenditures for Rolling Stock Feature $7,500,000 Programs of Nine Ohio Companies**

Many electric railways in Ohio are planning betterments and improvements of rolling stock and equipment this year.

The Cincinnati Street Railway proposes capital expenditures in the amount of $3,000,000. This will go toward new shops, additions and betterments to way and structures and miscellaneous improvements.

The Cleveland Railway is planning an expenditure of $2,050,000 for carhouses, new cars and buses.

While the Community Traction Company, Toledo, has not definitely decided on the new capital expenditures for this year, due to the fact that the proposed ordinance under which such expenditures would be made has not been passed, it is estimated that approximately $1,500,000 is required for rehabilitation not absolutely essential to the operation of the property but highly desirable.

The Chillicothe Electric Railway, Light & Power Company and the Ohio Utilities Company, which are owned and operated by the same interests, will expend $500,000, but the bulk of it will go toward the electric light department.

The Wheeling Traction Company, which operates in Washington, Jefferson and Belmont Counties, Ohio, probably will spend from $200,000 to $250,000 on track and roadway in Belmont County this year. In this instance it seems unlikely that any new rolling stock will be acquired during this year.

According to J. M. Pogue, general manager of the Indiana, Columbus & Eastern Traction Company, with headquarters in Springfield, Ohio, about $130,000 will be expended this year. Of this amount $80,000 will go toward track improvements and $50,000 toward new freight equipment.

The Cleveland Southwestern Railway & Light Company will expend approximately $75,000 for way, structures and power.

Track of the Steubenville, East Liverpool & Beaver Valley Traction Company east of Steubenville will be relocated at a cost of about $30,000.

The Dayton & Western Traction Company is committed to no fixed program of capital expenditure.

The Toledo & Western Railway, the Lima-Toledo Railroad and the Lima City Street Railway have not made their estimates for 1927 up to this time.

The Lake Shore Electric Railway will spend $150,000. New car seats will cost $30,000, snow-fighting equipment $10,000, overhead construction $100,000 and track improvement $10,000. The Lorain Street Railroad, controlled by the Lake Shore, will spend $100,000, of which $60,000 will go toward passenger cars and $25,000 for substations and $15,000 for carhouses.

## Lead Production Higher

January lead production by countries which supplied about 85 per cent of the world's output in 1925 was calculated last week at 131,783 tons, compared with 118,845 tons in January, 1926. The monthly average output in 1926 was 122,023 tons.

## First Reservation Sought for Car Space at Cleveland

Fred Dell, director of exhibits of the American Electric Railway Association, announced on March 4 that he had received his first request for track space at the Cleveland convention. J. R. Blackhall, vice-president of the Chicago & Joliet Electric Railway, Joliet, Ill., has indicated that he will show a new type of city car in Cleveland next October. One of the interurban cars of this company was exhibited at Cleveland last year by the Cummings Car & Coach Company. The receipt of this request for reservation of space seven months prior to the convention indicates quick response to the appeal of President Sawyer to the industry for a representative car exhibit.

## Electrification Extended by Mexican Railway

The officials of the Mexican Railway Company, Ltd., have arranged for the extension of the electric zone now operating over the Maltrata Incline eastward to Paso del Macho, a distance of about 22 miles. The most difficult portion of this grade section was converted to electrical operation in 1924, and during the past year an additional 17 miles was placed in service.

The extension now under way will require an additional substation which will be located at Portrero, a short distance east of Cordoba. Equipment for this extension, which will be supplied by the International General Electric Company, includes line material and bonding, and a complete 3,000-kw. substation, to contain two 1,500-kw., 3,000-volt synchronous motor-generator sets with transformers, switchboards and switching equipment. This station will be a duplicate of the present substation except in capacity.

When this extension is completed there will be a total of about 70 miles of electrified track running through the severest grade section of the line between Mexico City and Vera Cruz. Grades run as high as 5.25 per cent maximum, with an average of 4.7 per cent for about 25 miles. The remainder of the electric zone ranges from 2 to 3 per cent. All trains on these grades will be handled with regenerative electric braking and it is expected that the same 150-ton locomotives used on the original electric zone will be used on the extension.

The overhead line will be supported entirely by steel structures fabricated from used rails which the company has on hand. Due to the circuitous route followed by the railway tracks, the entire 70 miles will be fed from two substations. The motive power for the electric zone, all of which was furnished by the International General Electric Company, included ten locomotives of the six-axle type, with a normal hourly rating of 2,700 hp. These have been in service since 1924.

## American Brake Shoe Has Record Year

American Brake Shoe & Foundry Company reports for 1926 net profit of $3,029,216, after charges, depreciation and federal taxes. This is equivalent, after preferred dividends, to $15.04 a share on the 156,928 shares of no-par-value common stock. It compares with $2,786,607, or $13.57 a share, on 156,093 shares outstanding in 1925.

The balance sheet as of Dec. 31 shows total assets of $30,108,590, against $28,747,182 at the close of 1925, and a profit and loss surplus of $9,640,486, compared with $8,119,314.

In his report to the stockholders, Joseph B. Terbell, president of the company, writes:

A new wheel plant is under construction at Toledo, Ohio, similar in design to the new St. Louis plant. The building of this plant is necessary in order to take care of the increasing business in that district.

A further extension of the car wheel company occurred in December by the purchase of the plant and equipment of the New York Car Wheel Company of Indiana, located at Hammond, Ind. Your companies have not heretofore sold wheels in the Chicago territory. The Hammond plant is located on one of the belt lines of Chicago, giving it access to the various railroads entering that city. Based upon the previous tonnage of wheels produced by this plant, we expect the earnings will justify its purchase.

A new brakeshoe plant has been established in Pittsburgh, Pa., by converting the plant of the Pennsylvania Casting & Machine Works into a brakeshoe foundry. With the addition of this plant we now have, with few exceptions, brakeshoe plants at all of the larger railroad centers.

During the year the American Brake Materials Corporation was incorporated to take over the manufacture and sale of "brakebloks" designed for use on automotive equipment. It is expected that by the first of April the corporation will begin operations at Detroit, where new machinery is now being installed.

Our two principal associated companies, the Ramapo Ajax Corporation and the American Manganese Steel Company, have each shown satisfactory results, the latter having enjoyed the largest net earnings in its history.

## Time Extended for Work on Texas Interurban

The City Commission at Dallas, Tex., has voted the Dallas Southwestern Traction Company until Dec. 31, 1927, to construct 5 miles of the proposed interurban line from Dallas to Irving.

The action was taken at the request of E. P. Turner in compliance with

provisions of the charter franchise granted the company and on payment by the company of a forfeit of $1,400 in bonus money of the $15,000 fund originally deposited with the city when the franchise was granted.

Mr. Turner in the application for an extension of time pointed out that at least 82 per cent of the grading for the line already has been completed, but that the company has so far been unable to dispose of bonds for financing the completion of the line.

It originally had been stipulated that the company must have completed 10 miles of the line by a certain date, which has been extended previously from year to year. By the action just taken the City Commission reduced the mileage that must be constructed in the time limit from 10 to 5.

## Brill 177-E Trucks for Fitchburg Order

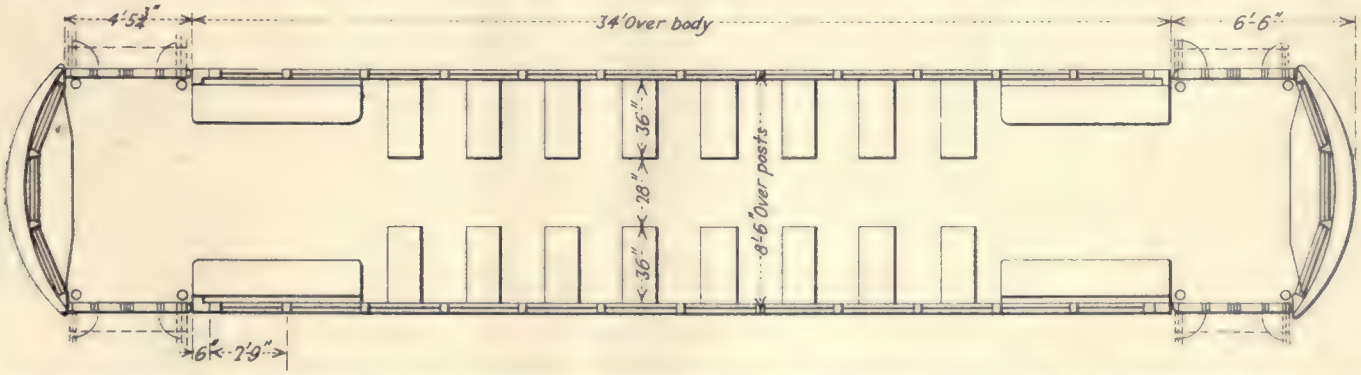
Brill 177-E trucks will be used on the four double-truck safety cars ordered by the Fitchburg & Leominster Street Railway, Fitchburg, Mass., and also on the 25 double-truck safety cars recently ordered by the Eastern Massachusetts Street Railway. In announcing the award of the Fitchburg & Leominster Street Railway order, the JOURNAL inadvertently gave the truck number as 117-E instead of 177-E.

## Wheeling Company Operating New Cars

Following are specifications for the fifteen double-truck light-weight cars mentioned in the JOURNAL of Sept. 4, 1926, as having been ordered by the Wheeling Public Service Company, Wheeling, W. Va., from the G. C. Kuhlman Car Company, a subsidiary of the J. G. Brill Company. The new cars were delivered on Dec. 27, 1926, and are now in service. Order for the rolling stock was placed July 25, 1926.

Spacious Interior of the New Cars Recently Delivered by the G. C. Kuhlman Car Company to the Wheeling Public Service Company

| | |
|---|---|
| Seating capacity | 48 |
| Weights: | |
| Car body | 17,600 (estimated) lb. |
| Trucks | 6,110 (including gears) lb. |
| Equipment | 9,420 (estimated) lb. |
| Total | 33,130 (estimated) lb. |
| Bolster centers, length | 24 ft. 0 in. |
| Length over all | 47 ft. 0 in. |
| Truck wheelbase | 5 ft. 4 in. |
| Width over all | 8 ft. 8 in. |
| Height, rail to trolley base | 10 ft. 8 in. |
| Body | Semi-steel |
| Interior trim | Mahogany |
| Headlining | Agasote |
| Roof | Arch |
| Air brakes | Westinghouse |
| Axles | Brill |
| Bumpers | Channel |
| Car signal system | Faraday |
| Car trimmings | Kuhlman |
| Center and side bearings | Brill |
| Control | K-35 |
| Curtain fixtures | Rex |
| Curtain material | Pantasote |
| Destination signs | Hunter |
| Door mechanism | National Pneumatic |
| Fenders | Steel pilot |
| Finish | O'Brien enamel |
| Hand brakes | Brill, vertical handle |
| Heater equipment | Utility |
| Headlights | Golden Glow |
| Journal boxes | Brill |
| Lightning arresters | Westinghouse |
| Motors | Four Westinghouse No. 514-A, outside hung |
| Sanders | Nichols-Lintern |
| Sash fixtures | Rex |
| Seats | Brill 201-B |
| Seating material | Genuine Spanish grain leather |
| Slack adjuster | Westinghouse |
| Springs | Brill |
| Step treads | Kass |
| Trolley catchers | Knutson No. 5 |
| Trolley base | U. S. No. 20 |
| Trucks | Brill 177-E |
| Ventilators | Nichols-Lintern |
| Wheels | 28-in. |



Fifteen of These Cars Are Now Serving the Citizens of Wheeling, W. Va.

## 50 to 100 Cars for Toronto

The Toronto Transportation Commission is to ask tenders on 50 or 100 new cars, the number to be bought depending somewhat on the reduction which may be obtained for quantity. The purchase will be financed out of the commission's own reserves, which are available to the extent of $1,500,000. Chairman Ellis of the commission is reported to have said:

> We anticipate buying the cars in Canada, but will not build them ourselves. They are for use on existing routes. Their purchase will not mean the abandonment of cars already in use—the one-man cars, for instance? They will be additional. The one-man car is thoroughly established everywhere and the technical journals are full of its praises.

## Charlotte Company Experiments in Building Cars

Mechanics of the Southern Public Utilities Company, Charlotte, N. C., recently turned out from the company's Charlotte car shops a new 18-ton, 40-passenger car which, with the exception of trucks and air brake equipment, was built from stem to stern by the company's force. The work was under the direction of W. B. Osborne, master mechanic, and the new car cost approximately $10,000.

## *Rolling Stock*

**Macon Railway & Light Company, Macon, Ga.,** if a program suggested to the city is approved, will purchase sixteen new cars and rebuild old ones retained.

**Burlington Traction Company, Burlington, Vt.,** is putting Johnson D. M. fare boxes on its rolling stock in connection with a change to one-man operation.

**Market Street Railway, San Francisco, Cal.,** is planning several new features for the 73 cars now being constructed in its shop. All cars will have crosswise seats, leather-cushioned. In the smoking compartments the latest model rattan and wicker seats will be used. The smokers will be glassed in on one side and open on the other. The open sides will be equipped with tight-fitting storm curtains. When these are in use there will be ample light from the glass windows opposite, and in the heat of summer the glass windows can be lowered.

**Jamestown Motor Bus Transportation Company, Jamestown, N. Y.,** subsidiary of the Jamestown Street Railway, has purchased six 21-passenger buses from the Reo Motor Car Company, to be placed in service on the company's city bus routes. The new buses are of the street car type, with pay as you enter facilities. An especially attractive color scheme has been worked out. The bodies have been painted a Quaker gray, with a town car blue stripe and letterboard.

**Western Ohio Railway, Lima, Ohio,** has installed its first chair car, and an exhibition trip from Lima to Wapakoneta, Ohio, and return was arranged for a party of officials and guests. The new car is divided into three compartments. The major compartment is equipped with bucket type chairs, fitted with air cushions and luxuriously finished in plush. The seats in the smoking compartment are finished in Spanish leather. The company plans to complete the reconstruction of its cars at the rate of one car a month.

**Los Angeles Railway, Los Angeles, Cal.,** has equipped all of its cars and buses with Johnson D. M. fare boxes, designed to accept pennies, nickels and dimes and also tokens of 0.650 in. diameter. The tokens are being sold six for 50 cents.

## *Trade Notes*

**Hubbard & Company,** manufacturers of shovels, spades, scoops and railroad track equipment, recently held their third annual sales convention in Pittsburgh, Pa. The meeting was attended by all the company's salesmen, district managers, and three plant managers. In addition to discussing the sales and advertising program, the force heard several stirring sales talks made by officials of several larger manufacturing concerns.

**Copper and Brass Research Association** announces the appointment of H. A. Call of New York as mid-Western representative. Mr. Call has left New York to establish a branch in St. Louis.

**H. D. James** has been promoted to consulting control engineer of the Westinghouse Electric & Manufacturing Company, and **E. B. Newill** appointed manager of the control engineering department, according to a recent announcement by Vice-President Rugg. Mr. James, a native of Baltimore and a graduate of the University of Pennsylvania, has been continuously associated with the Westinghouse company since 1904. He has been president of the Engineering Society of Western Pennsylvania, chairman of the subcommittee of the Electric Safety Conference and chairman of the control section of the Electric Power Club and is an original Fellow of the American Institute of Electrical Engineers. Mr. Newill, a native of Atlanta, Ga., has been with the Westinghouse company since 1915. He is a graduate of the Georgia Institute of Technology.

**Sullivan Machinery Company, Chicago, Ill.,** announces that it will occupy booths 122 and 123 at the Railway Appliance Exhibition in the Coliseum, Chicago, March 7 to 10 inclusive. Equipment to be exhibited will include portable and stationary air compressors; an operating model of the Sullivan air lift pump; one-man hammer drills; pneumatic concrete breakers; clay spaders; and a portable Turbinair hoist. The company will be represented by Joseph H. Brown, sales manager, Chicago; R. W. Scott and George Rowen, Chicago sales department; and by John Oliphant, manager pneumatic pumping department.

**W. C. Stettinius,** president of the American Hammered Piston Ring Company, Baltimore, Md., has been appointed a member of the merchandising committee of the Automotive Equipment Association, filling the vacancy caused by the resignation of T. H. Quinn of the National Lamp Works of the General Electric Company. Mr. Stettinius at the present time is president of the N.S.P.A., having been elected to that office at the association's meeting last November, and has also in the past served on the service parts committee of the A.E.A.

## Metal, Coal and Material Prices

| Metals—New York | Mar. 1, 1927 |
|---|---|
| Copper, electrolytic, cents per lb | 13.15 |
| Copper wire, cents per lb | 15.25 |
| Lead, cents per lb | 7.55 |
| Zinc, cents per lb | 7.16 |
| Tin, Straits, cents per lb | 69.55 |
| **Bituminous Coal, f.o.b. Mines** | |
| Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons | $4.625 |
| Somerset mine run, Boston, net tons | 1.925 |
| Pittsburgh mine run, Pittsburgh, net tons | 1.85 |
| Franklin, Ill., screenings, Chicago, net tons | 2.175 |
| Central, Ill., screenings, Chicago, net tons | 1.875 |
| Kansas screenings, Kansas City, net tons | 2.425 |
| **Materials** | |
| Rubber-covered wire, N. Y., No. 14, per 1,000 ft | $5.50 |
| Weatherproof wire base, N. Y., cents per lb | 16.75 |
| Cement, Chicago net prices, without bags | 2.05 |
| Linseed oil (5-bbl. lots), N. Y., cents per lb | 10.50 |
| White lead in oil (100-lb. keg), N. Y., cents per lb | 14.50 |
| Turpentine (bbl. lots), N. Y., per gal | $0.72 |

## *New Advertising Literature*

**Charles Cory & Son, Inc., 183 Varick Street, New York City,** are now distributing their new bulletin, No. 60-29-A, describing annunciators, bells, button and signal equipment. The bulletin contains 60 pages of descriptive text, 117 illustrations, alphabetical, numerical and thumb indexes.

**Ohio Brass Company, Mansfield, Ohio,** has recently issued a folder describing its Form 4 trolley base. Outstanding features of construction, as claimed by the manufacturer, are: The use of hardened steel bushings on the hinged fork which pivots with the vertical movement of the trolley pole; the use of forged steel eyes within closed-in end tension springs; use of renewable bearing spools on the lower ends of the tension springs, where they are anchored to the turret arm studs; and the use of a long trolley pole supporting clamp.

**United States Rubber Company** is issuing a facsimile of *World's Work* magazine, in which is reprinted "The Story of Rubber," which appeared in that magazine for January, 1927.

**Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.,** is mailing out a folder describing its industrial electric furnaces. The folder includes specifications on the type H box furnace, type O lead and salt baths, and type J lead and salt pots.

**Wiswell Improved Railroad Crossing Company, Chicago, Ill.,** is issuing a circular letter descriptive of its noiseless crossings, to which is attached a testimonial letter from W. L. Roller, engineer of maintenance of way Hocking Valley Railway Company, Columbus, Ohio.

**Mack Trucks, Inc., New York, N. Y.,** has just issued an elaborate poster illustrating the effect of torque or twisting efforts upon crankshafts of different diameters.

# *Summer or Winter—*

# "Peacock" Staffless Brakes!

Reg. U. S. Pat. Off.

Modern car buyers are specifying "Peacock" Staffless Brakes because they know either from their own experience or from that of others that the "Peacock" Staffless will positively hold them during all seasons of the year and regardless of climatic conditions.

Many other features,—such as little platform space occupancy—low installation and maintenance costs—simple, yet dependable operation,—absolute safety—three times the braking power of ordinary hand brakes, almost unlimited chain winding capacity (12 feet if necessary) without jamming or binding—excess of slack cannot put them out of commission—and many others—make "Peacock" Staffless Brakes an important factor in modern car specifications! That is why they are included in almost all new car specifications.

May we mail you full details?

**The Peacock Staffless**

## National Brake Co., Inc.

**890 Ellicott Sq., Buffalo, N. Y.**

***Canadian Representative:***

**Lyman Tube & Supply Company, Limited, Montreal, Canada**

# What SUPERTWIST Adds to Goodyear Tires

*One of the Goodyear-equipped fleet of buses operated by the Yosemite Park and Curry Co.*

You know what rugged strength and long life have always been built into Goodyear Pneumatic Bus Tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for Goodyear balloon tires, motorbus and heavy duty cord tires.

It far outstretches ordinary cotton cord, and has a maximum flexing power that yields under impact, protecting the tire from rupture, stone bruise and other injuries. It thus insures virtually *double* the *carcass* life of the tire.

Other exclusive features of the Goodyear Pneumatic Tire construction for motorbus service are (1) the new Goodyear band-building method; (2) the new Goodyear breaker; (3) the new Goodyear bead—patent applied for, and (4) the famous All-Weather Tread.

These advantages you get only in Goodyear Pneumatic Bus Tires—the only motorbus tires made of SUPERTWIST.

They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort and long, trouble-free mileage at low cost.

*Goodyear Means Good Wear*

GOODYEAR

Copyright 1927, by The Goodyear Tire & Rubber Co., Inc.

21-pass. Studebaker Pay-Enter Street-car-type bus

$5125 F. O. B. factory

# Ohio Valley Bus Co. Makes Fourth Purchase of Studebaker Busses in Ten Months

BECAUSE of the splendid records established by their Studebaker Busses, the Ohio Valley Bus Co. of Huntington, W. Va., a subsidiary of the American Gas and Electric Co., of N. Y., continues to specify Studebakers when new equipment is needed.

The recent delivery of three Studebaker 21-Passenger-Street-Car-Type Busses gives this company a total of eleven Studebakers, all purchased within 10 months and in direct competition with other makes.

These consistent repeat orders for Studebaker bus equipment indicate very definitely the entire satisfaction given by the units originally purchased.

Owners of Studebaker busses make more net profit per unit in operation because Studebaker busses cost less to buy, have a lower depreciation rate, maintenance costs are less and operating costs decidedly lower than with any heavy truck type built.

There are 265 Studebaker busses with mileage records ranging from 100,000 to 300,000 miles and upwards, demonstrating the sturdy qualities and long life of Studebaker equipment. Depreciation figured at a conservative 20% amounts to 2.5 cents a mile as against 4 cents for the large truck type bus. And economy of operation is proved by an investigation of six different bus chassis in 8 cities which revealed that it costs 7 to 9 cents less per mile to operate a Studebaker Bus.

Such evidence indicates the relative advantages of Studebaker busses and shows why first-time Studebaker bus owners are repeat purchasers when new equipment is needed.

*—first cost*
*—operating cost*
*—maintenance cost*
*—depreciation cost*

**Lower**

# STUDEBAKER

*[Seventy-Five Years Young]*

# GUM-DIPPING

## The Process for Extra Miles

Firestone dips the cords of the carcass in a rubber solution, saturating and insulating every fiber of every cord with rubber.

This minimizes friction and wear, reducing tire troubles, and gives these big tires extra stamina and endurance for long speedy runs.

The special scientifically designed tread grips the road and holds the bus to its course on slippery pavements or rounding turns—giving to passengers safety, comfort and mental composure.

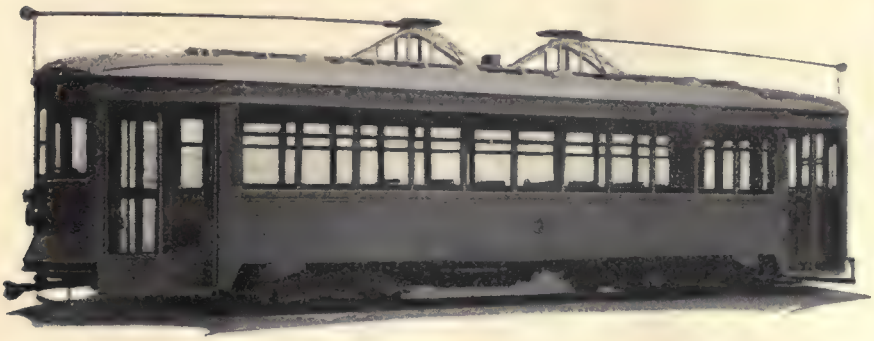
The biggest bus fleets in all parts of the country—guided by careful cost records—standardize on Firestone Gum-Dipped Tires. Ask the nearest Firestone dealer or branch for performance facts concerning Gum-Dipped tires in bus service.

MOST MILES PER DOLLAR

# Firestone

## GUM-DIPPED TIRES

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER.... Harvey S. Firestone



*The cars illustrated were built by the J. G. Brill Company, Philadelphia, and finished in Duco, for Compania Chilene de Electricidad, Santiago, Chile.*

# Make the car itself do a subtle selling job

IT'S subtle—but it's important. If your cars convey, to the men and women who buy rides in them, a favorable impression, they will have, in large measure, a favorable impression toward the company that operates them.

If your cars are finished with Duco, you can be proud of their appearance. For Duco withstands the ravages of snow, sleet, ice, dust, blistering suns. A Duco finish means a finish *that stays new.*

So much for the selling job. On the side of costs, what about Duco? Let one of our Railway Finishing Service Engineers tell you what Duco can do in keeping down maintenance and upkeep costs.

DU PONT DUCO REG. U. S. PAT. OFF.

**There is only ONE Duco—Du Pont Duco**

**Duco is the correct finishing material for railway equipment. For information write to the E. I. du Pont de Nemours & Co., Inc., Chemical Products Division, Parlin, N. J., 2100 Eston Ave., Chicago, Ill., or 569 Mission St., San Francisco, Cal.**

DU PONT

# "The best tires I have ever had"

Kansas City, Kas.
January 6th, 1927.

Kelly-Springfield Tire Co.,
Kansas City, Mo.

Gentlemen:

Being rather proud of my little twenty-one passenger bus all dressed up in Kellys, I had a picture taken of it and am sending you a copy.

This bus travels 140 miles per day and some of these tires have gone about 10,000 miles with very little signs of wear and no trouble at all, not even a puncture. They are 30 x 5 Kelly Heavy-Duty Cords.

They are the best tires I have ever had.

Yours very truly,

Oliver Colthart

Other bus operators, too, have discovered that the extra mileage built into Kelly Heavy-Duty Cords, makes them most economical. To cut down operating costs Kelly must give more mileage and less trouble. Bus owners from coast to coast have found that they do—that's why so many of them are standardizing on Kellys.

KELLY SPRINGFIELD TIRE CO.
250 West 57th Street New York, N. Y.

# KELLY HEAVY DUTY CORD

# Performance Counts!

**Repeat Orders are based on Performance**

# After their experience Operators

## Mack's latest

**20 Six-cylinder - - - -**
gas-electric drive Mack buses

**37 Six-cylinder - - - -**
gas-electric drive Mack buses

**70 Four-cylinder - -**
gas-electric drive Mack buses

**40 Six-cylinder - - - -**
mechanical drive Mack buses

**Newark buys 147 more Macks!**

# after comparison —

# choose Macks

**large orders**

**- - United Traction Co.**
Albany, N. Y.

**- - Public Service Corp. of N. J.**
Newark, N. J.

**- - Public Service Corp. of N. J.**
Newark, N. J.

**- - Public Service Corp. of N. J.**
Newark, N. J.

**Albany buys**
**20 more Macks!**

# Mack Owners Repeat on Macks After Their Experience With All Other Makes of Buses

## Recent Repeat Orders

Boston & Worcester Street Railway

Yakima Valley Transportation Co.

Utah Light and Traction Co.

Lincoln Traction Co.

United Traction Co.

Northern Ohio Power and Light Co.

Boston Elevated Railway

Virginia Electric and Power Co.

The Connecticut Co.

Houston Electric Co.

Third Avenue Railway Co.

Boise Street Car Co.

Public Service Corp. of New Jersey

Twin City Rapid Transit Co.

Illinois Power Co.

Utah Idaho Central R.R. Co.

Tri-City Railway Co.

City of Alexandria (La.)

Community Traction Co.

## Assuredly — Performance Counts!

**Mack Trucks, Inc.**

International Motor Company

25 Broadway, New York City

Long Products - Automotive Clutches and Radiators

Accurately engineered and proven in its worth, the Long Clutch makes for the utmost in smooth, silent clutch operation.

We are offering you this service.

THE LONG MANUFACTURING COMPANY
DETROIT MICHIGAN

LONG

# You are your Credit Man When it comes to Buying Orders

THE orders you take come under the watchful eye of the credit man.

How about the orders your company places—the orders that you make?

If the reliability of the manufacturer is checked when you sell it should be checked when you buy.

Whether his is a dependable source of purchase is important to learn before—not after his products are in your plant.

What can you expect in the way of prompt and continuous deliveries?

What about quality uniformity?

Has he the ability to finance your orders?

* * *

A reliable aid is here—in this publication. Most of the manufacturers in this issue have been running their advertising in this publication continuously year after year.

They are established. They do not advertise something they cannot deliver. They cannot deliberately exaggerate product merit or institutional service.

Why? Because this publication is A.B.P.—meaning it is a member of the Associated Business Papers. This means, broadly, that this publisher has that basic A.B.P. requirement—integrity.

If a product you need is not advertised in this publication, ask the publisher to direct you to a reliable source.

*This publication is a member of*

The ASSOCIATED BUSINESS PAPERS, Inc.

*An association of none but qualified publications reaching the principal fields of trade and industry*

Executive Offices: 52 Vanderbilt Ave., New York, N. Y.

101 YEARS OF MANUFACTURING EXPERIENCE

Cane Webbing may be ordered through any H-W sales office.

Interior of one of the new Eastern Texas Interurban Cars, showing the installation of our No. 11-F.

## JUST WHAT THEY WANTED!

THE Eastern Texas Interurban Company was looking for an unusual seat—one that would afford more seating capacity and comfort in a minimum amount of space.

They found just such a seat in the new Heywood-Wakefield 11-F (shown above). This new unit, adapted to interurban and long-distance use, actually affords greater comfort and seating capacity in the shortest over-all length of any seat now on the market. The padded backs are pitched at a restful angle. The deep, roomy seats have comfy spring cushions over our specially built-up construction and the underframe of the seat is of durable pressed steel.

*We shall be glad to send you complete information on this practical seat, as well as a copy of our new Bus Seat Catalogue.*

Heywood-Wakefield
REG. U.S. PAT. OFF.

Heywood-Wakefield Co., Wakefield, Mass.; 516 West 34th St., New York, N. Y.; 439 Railway Exchange Bldg., Chicago, Ill. H. G. Cook, Hobart Bldg., San Francisco, Cal. The G. F. Cotter Supply Co., Houston, Texas. F. N. Grigg, 630 Louisiana Ave., Washington, D. C. The Railway & Power Engineering Corp., 133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada.

# In Large Cities

**in DETROIT** *The Department of Street Railways of the City of Detroit is now operating 198 Graham Brothers Motor Coaches.*

**in GRAND ISLAND** *These Graham Brothers Motor Coaches provide the public transportation for this Nebraska city.*

# GRAHAM MOTOR

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

# and in Small

## *Sales of Graham Brothers 21-Passenger Street Car Type Motor Coaches Continue to Emphasize the Trend Toward the Medium Capacity Motor Coach*

Ruggedness of construction, adaptability, ease of handling, comfort, speed, dependability—all these qualities so marked in Graham Brothers Motor Coaches are essential to successful motor coach operation anywhere.

And Graham Brothers fleets are operating, from coast to coast, in large cities and in small, with uniform satisfaction.

The fine appearance of Graham Brothers 21-Passenger street car type coach attracts patronage. Its comfortable interior, its smooth, quiet operation and its dependability hold that patronage . . . And it stands up in the rigorous service of street railway operation. Service, when needed, is available from Dodge Brothers Dealers—always and everywhere.

GRAHAM BROTHERS
EVANSVILLE – DETROIT – STOCKTON
A DIVISION OF DODGE BROTHERS, INC
GRAHAM BROTHERS (CANADA) LIMITED, TORONTO, ONTARIO

**Standard 21-Passenger Street Car Type, complete, $3815**
**12-Passenger Parlor Coach, complete, $3750**
*f. o. b. Detroit*

# BROTHERS COACHES

# Why Don't They Ride the Street Cars?

STREET car riders must be sold against keen competition. Present day riders are discriminating. They expect equipment equal in attractiveness to the private automobiles which crowd the boulevards. They expect comfort and safety as well as speed and frequent service.

The best salesman of street car rides is the right kind of a car—the modern car that invites the rider and is so economical to operate that it can be run on a frequent, fast schedule.

The modern car—one utilizing HASKELITE and PLYMETL fully—has demonstrated its ability to sell rides to an unsurpassed degree. Its external appearance—with smooth-as-glass PLYMETL side panels and moulded HASKELITE roofs, just naturally attracts the riders. Its interior appearance with beautiful HASKELITE linings fully lives up to expectations. The low floor and step level made possible by the HASKELITE floor and the ample headroom due to HASKELITE roof construction are additional factors of attractiveness and comfort. Added to all this are the advantages of quiet operation, a high degree of heat insulation and the safety that comes from the super-strength of HASKELITE and PLYMETL.

Yes, they *will* ride the right kind of a street car. Note the representative list of big companies using HASKELITE and PLYMETL for car and bus construction.

Ask for our blue print booklets for full information on these HASKELITE products for street car and bus use.

**Representative users of HASKELITE and PLYMETL**

Boston and Maine R.R. Co., Boston, Mass.
Chicago, North Shore & Mil. Ry. Highwood, Ill.
Chicago Surface Lines, Chicago, Ill.
Cincinnati Traction Co., Cincinnati, Ohio
Columbus Ry., Power & Light Co. Columbus, Ohio
Denver Tramway Company Denver, Colo.
Detroit United Railway, Detroit, Mich.
Fort Smith Light & Traction Co., Fort Smith, Ark.
Galveston-Houston Elec. Co., Galveston, Texas
Grand Rapids Ry. Co., Grand Rapids, Michigan
Georgia Ry. & Power Co., Atlanta, Georgia
Illinois Traction, Inc., Chicago, Ill.
Indiana Service Corp., Fort Wayne, Ind.
Los Angeles Railway Corp., Los Angeles, California
Milwaukee Elec. Ry. & Light Co., Milwaukee, Wisc.
Monongahela West Penn Public Service, Co., Fairmont, West Va.
Montreal Tramways Co., Montreal, Que., Can.
Municipal Ry. of San Francisco, San Francisco, Cal.
Pacific Northwest Traction Co., Seattle, Wash.
Pennsylvania-Ohio Elec. Co., Youngstown, Ohio
Philadelphia Rapid Transit Co., Philadelphia, Pa.
Pine Bluff Company, Pine Bluff, Ark.
Pittsburgh Railways Co., Pittsburgh, Pa.
Public Service Railway Co., Newark, N. J.
San Francisco-Sacramento R.R., Oakland, Cal.
Toronto Transportation Commission, Toronto, Ontario, Canada
Union Traction Co. of Indiana, Anderson, Ind.
United Traction Co., Albany, N. Y.
York Street Railways, York, Pa.

HASKELITE MANUFACTURING CORPORATION
133 West Washington Street, Chicago

Canadian Representatives:
Railway and Power Engineering Corporation, Ltd.
Montreal Toronto Winnipeg

This Montreal Tramway Car was built by the Canadian Car & Foundry Company, Ltd. with PLYMETL side panels.

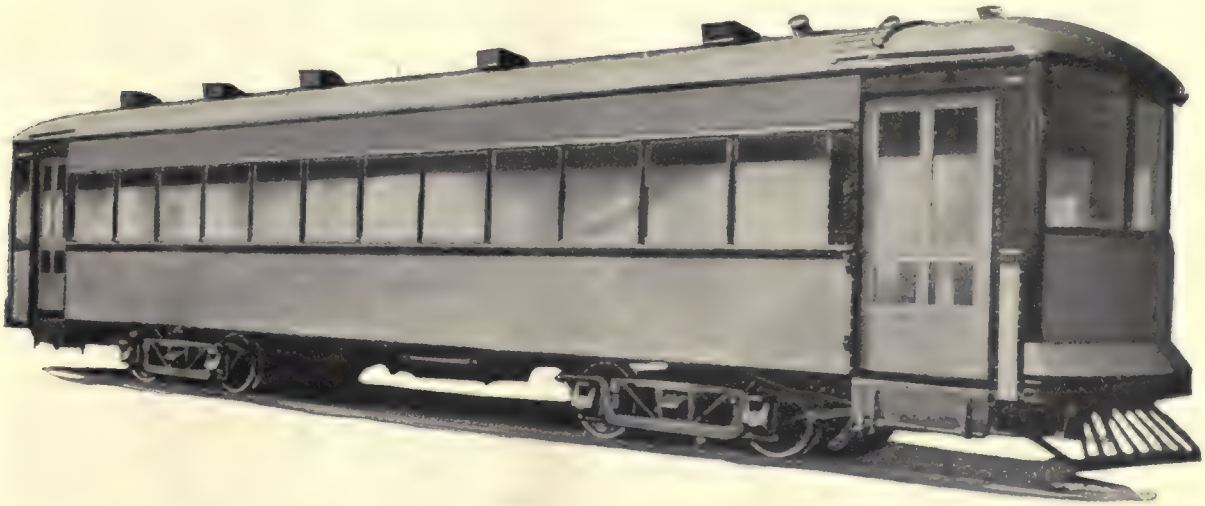
PLYWOOD
HASKELITE
PLYMETL

Mack bus equipped with HASKELITE roof. Operated by Howard Bus Lines, Columbus, Ga.

ERJ3-5Gray

# "Money spent for new cars . . . . . has been a profitable investment—"

Willits H. Sawyer



It is now a well known fact that modern cars make for greater revenue as well as lowered upkeep. Attractive, comfortable, speedy, they attract more passengers.

Cars of this type built for several of our customers are showing increased net earnings which will pay for themselves in five years or less.

CUMMINGS CAR AND COACH COMPANY

*Successors to McGuire Cummings Mfg. Co.*

111 W. Monroe Street, CHICAGO

# In Detroit, too—

MORE and more experienced buyers of motor coaches and trucks recognize Timken worm-drive as the ideal type of final drive.

Take Detroit, for example—where a vast industrial population spread over a huge fan-shaped area provides a real transportation problem.

There, the city's Department of Street Railways does an amazingly efficient job; and one factor in that efficiency is the newly added fleet of 50 a.c.f. motor coaches, equipped with Timken Axles—front and rear.

THE TIMKEN-DETROIT AXLE CO.
Detroit, Michigan

# TIMKEN AXLES

# a.C.f.-HALL-SCOTT

## For SEVERE SERVICE

a.C.f.

Where the ability of a motor coach to "carry on" unfailingly for a long period of time under extreme conditions is a factor, a.C.f. is generally chosen.

The added strength of its chassis, and the ability of the Hall-Scott Engine to keep on turning up the miles month after month and year after year, with a satisfactory economy all the while, have amply justified the faith of transportation men that the American Car and Foundry products would set the pace.

The Public Service Transportation Company has again voiced the faith of the leaders of the industry.

# a.c.f.-HALL-SCOTT

# 65 of the 102

six cylinder Gas-Electric Coaches which the Public Service Transportation Company of New Jersey recently purchased for their heaviest service were a.c.f.

Among the prominent public utility users of a.c.f. built coaches are the following:

| | |
|---|---|
| New England Transportation Co. | New Haven, Conn. |
| New Orleans Public Service, Inc. | New Orleans, La. |
| Morris County Traction Co. | Morristown, N. J. |
| Washington Rapid Transit Co. | Washington, D. C. |
| Youngstown & Suburban Transportation Co. | Youngstown, Ohio. |
| Third Avenue Railway | New York, N. Y. |
| City of Detroit, Dept. of Street Railways | Detroit, Mich. |
| Scranton Railway Company | Scranton, Pa. |
| Miami Beach Railway Co. | Miami, Fla. |
| Olean, Bradford & Salamanca Rly. Co. | Olean, N. Y. |
| Boston Elevated Railway Co. | Boston, Mass. |
| Wisconsin Power & Light Co. | Madison, Wisc. |
| Shore Line Motor Coach Co. | Gary, Indiana |
| Midland Utilities Co. of Indiana | Chicago, Ill. |
| Peoples Motor Coach Co. (D.U.R.) | Detroit, Mich. |
| Aronimink Transportation Co. | Llanerch, Pa. |
| Milwaukee Electric Ry. & Light Co. | Milwaukee, Wisc. |
| Pennsylvania-Ohio Electric Co. | Youngstown, Ohio. |
| Southern Michigan Transportation Co. | Jackson, Mich. |
| Central Transportation Co. | Trenton, N. J. |
| Asheville Power & Light Co. | Asheville, N. C. |
| Poughkeepsie & Wappinger's Falls Ry. Co. | Poughkeepsie, N. Y. |
| Wichita Motor Bus Co. | Wichita, Kansas |
| Chicago, North Shore & Milwaukee R. R. Co. | Chicago, Ill. |
| Wisconsin Motor Bus Lines | Milwaukee, Wisc. |
| Aurora, Elgin & Fox River Ry. Co. | Elgin, Ill. |
| Maine Central R. R. Co. | Portland, Me. |
| Northern Ohio Power Co. | Akron, Ohio. |

**American Car and Foundry Motors Company**
**30 Church Street**
**New York**

No. 211-AE

# One of the newest H-K Seats

Among the recent designs brought out by Hale-Kilburn is the No. 211-AE Seat for de luxe suburban, single-end cars. Comfort is the key-note.

It has extra deep, soft spring edge cushions and soft spring back, shaped especially to be form-fitting.

The steel ends have mahogany armrests.

This H-K Seat provides passengers with the easy comfort of their favorite home chair.

*Ask for Bulletins to get full particulars of the complete line of H-K Seats.*

## HALE-KILBURN COMPANY

***General Offices and Works:*** **1800 Lehigh Avenue, Philadelphia**

**SALES OFFICES:**

Hale-Kilburn Co., 30 Church St., New York
Hale-Kilburn Co., McCormick Bldg., Chicago
E. A. Thornwell, Candler Bldg., Atlanta
Frank F. Bodler, 903 Monadnock Bldg., San Francisco
Chris Eccles, 320 S. San Pedro St., Los Angeles
T. C. Coleman & Son, Starks Bldg., Louisville
W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
H. M. Euler, 146 N. Front St., Portland, Oregon

**Hale and Kilburn SEATS**

# *The Quick Getaway*

## and the Car-door Engine

WHEN an irate passenger bangs on the door and damns the company up and down, it doesn't soothe his ruffled feelings to tell him that the car door engine is stuck—stuck on account of a trifle.

It's all wrong. It violates one of the cardinal principles of good railroading. (Unload fast; load again faster and get away with a snap.)

Nor does it really help to send that car to the shop, only to have it back again, within a short time, for the same reason.

No, the right way is the simple way: Watch the little things. And the little thing on a car door engine which makes trouble is the drying and cracking of the leather cups.

The easy way in this case is to use Texaco Star Grease No. 00, a pure, high quality lubricant that keeps plungers sliding smoothly, leather cups soft and pliable; that helps them do their work to maintain compression.

The whole thing in a nutshell: Live leather—no cracks in the cups; no leaks; good operation of doors; cars kept out of shops.

And so Texaco Star Grease No. 00 helps to maintain "On Time Schedules."

Remember, then, that Texaco Star Grease No. 00 helps car door engines to open and shut—*like that!*

### TEXACO
### Star Grease No. 00

besides being used on car door engines, is also recommended for brake cylinders, controller fingers, motorman's valves, pneumatic and magnetic controls.

It is packed in a 5-lb. handy screw top can, clean and convenient. Also in barrels and half barrels.

TEXACO

# THE TEXAS COMPANY

DEPT. R-J. 17 BATTERY PLACE · NEW YORK CITY
HOUSTON · CHICAGO · NEW YORK
OFFICES IN PRINCIPAL CITIES

TEXACO

# "STANDARD" STEEL PARTS

## MODERN ALL THE WAY THROUGH

The modern car is modern, not in size and appearance only, but in all the hidden vital parts which contribute toward economy and dependability in operation. The specification of "Standard" Steel Wheels, Axles, Armature Shafts and Springs will help you to obtain a car that is modern all the way through.

# STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
ST. LOUIS
NEW YORK

HOUSTON, TEXAS
PORTLAND, ORE.
RICHMOND, VA.

SAN FRANCISCO
ST. PAUL, MINN.
PITTSBURGH, PA.

WORKS: BURNHAM, PA.

# Rome Wire---
# Moser & Cotins---
# CONGRATULATIONS!

The Bok Award for the outstanding industrial advertising campaign of 1926, announced February 15th by the Harvard Jury, goes to the Rome Wire Company of Rome, N. Y. and their advertising agents, Moser & Cotins of Utica, N. Y.

The campaign which won this distinction consisted of a series of process colored inserts which were regularly published in

| | |
|---|---|
| *ELECTRICAL WORLD | *COAL AGE |
| *ELECTRICAL WEST | *INDUSTRIAL ENGINEER |
| *ELECTRICAL MERCHANDISING | JOBBER'S SALESMAN |
| *ELECTRIC RAILWAY JOURNAL | ELECTRICAL RECORD |

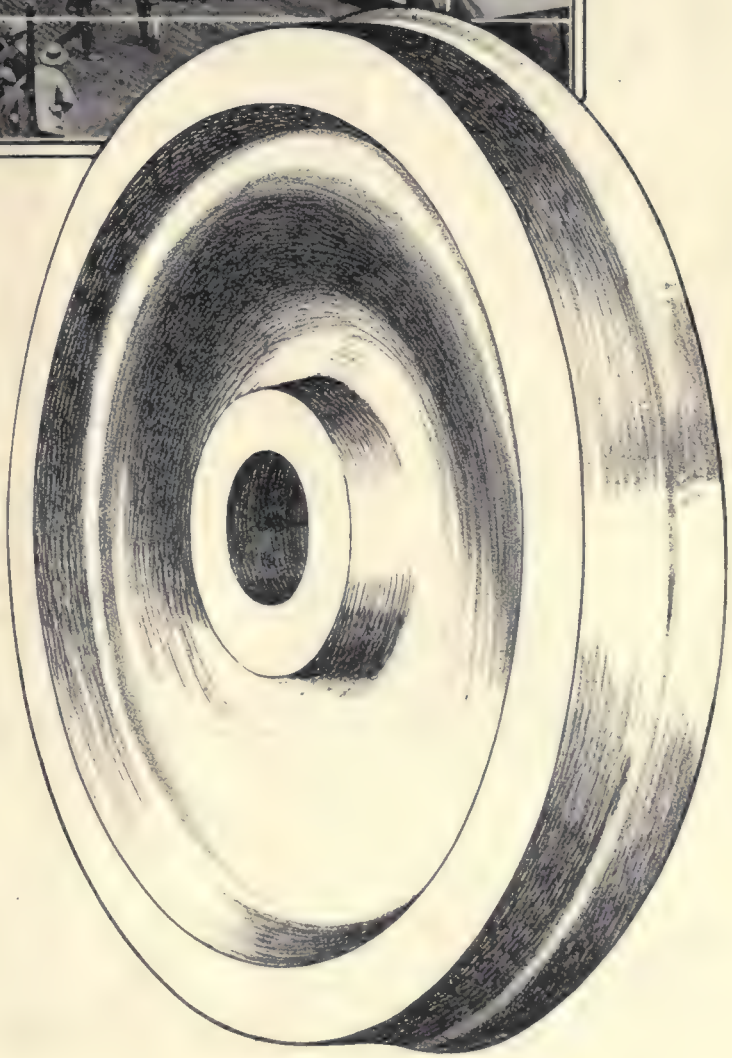
This campaign of attractive advertisements made no bid for inquiries but knuckled down to the job of making industry and the electrical trade wire-conscious. Persistently followed up, this campaign has helped lift a basic industrial product out of the more or less nondescript "supply" class and identified it in terms of the buyer's wire requirements. It has established the name "Rome" as a synonym for conductor wire service.

We congratulate Rome and its advertising agents and are pleased that McGraw-Hill Publications were identified with the winners in the preliminary market studies and in the publishing of the resultant campaign.

*—*indicates McGraw-Hill Publication*

McGRAW-HILL PUBLISHING COMPANY, INC.
*Tenth Avenue at 36th Street, New York*

*Clark Street, Chicago, Between Randolph and Washington, 1887.*



# Compare This Scene With That of Today!

The calm, leisurely days of a few decades ago! ... No unbroken procession of automobiles, no thundering motor trucks, no hurrying dashing crowds.

Contrast this scene with that of today: Peak periods, rush hours, stringent schedules; quick starting, sudden stopping, frequent recurrence of emergencies.

Yes, traffic conditions have changed ... and the Gary Wrought Steel Wheel has kept pace with the change.

Our wheel engineers are at your command.

**Illinois Steel Company**

General Offices:
208 South La Salle Street
Chicago, Illinois

An increasingly large portion of the actual income derived from car card advertising service must be devoted to building and maintaining the prestige of car card advertising in the face of the active competition of all other media.

Creating and protecting our mutual interest is a costly item.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

Interior View of One of Bethlehem Track Layout Buildings

# *Workmanship and Quality*

Laying out and fitting of special layouts and trackwork for Electric Railways necessitates extreme accuracy.

All Trackwork is manufactured complete within the Bethlehem organization, thus permitting control over quality and workmanship. Special work jobs are assembled in large well lighted buildings especially equipped for such work—an exclusive Bethlehem feature.

## Condensed List of Railway Equipment

Special Trackwork
Tee Rails
Girder Rails
Special Splice Bars for Welding

Machine Fitted Joints
Abbott and Center Rib Base Plates
Pole Line Material

Tie Rods
Bolts
Rolled Steel Wheels
Forged Axles

BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

DISTRICT OFFICES:

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh Buffalo Cleveland
Detroit Cincinnati Chicago St. Louis San Francisco Los Angeles Seattle Portland

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of Our Commercial Products

# BETHLEHEM

# Where Safety and Appearance Dominate

IN the heart of a busy city, where safety must be maintained at its maximum, there is nothing so important in the selection of electric line poles as the certainty of their strength and endurance. Another important factor, of course, is their appearance.

Both of these requirements are embodied in the tubular steel pole and reach their maximum effectiveness in "NATIONAL" Poles, because of their great strength and reliability under severe conditions of service and their clean cut, neat appearance which adds to rather than detracts from the built-up surroundings.

Wherever the factors of safety and appearance dominate, it will pay you to specify "NATIONAL" Poles. Made by the largest manufacturer of Tubular Products in the world, with facilities for meeting a wide range of specifications in pole construction.

NATIONAL

NATIONAL TUBE COMPANY

*Frick Building, Pittsburgh, Pa.*

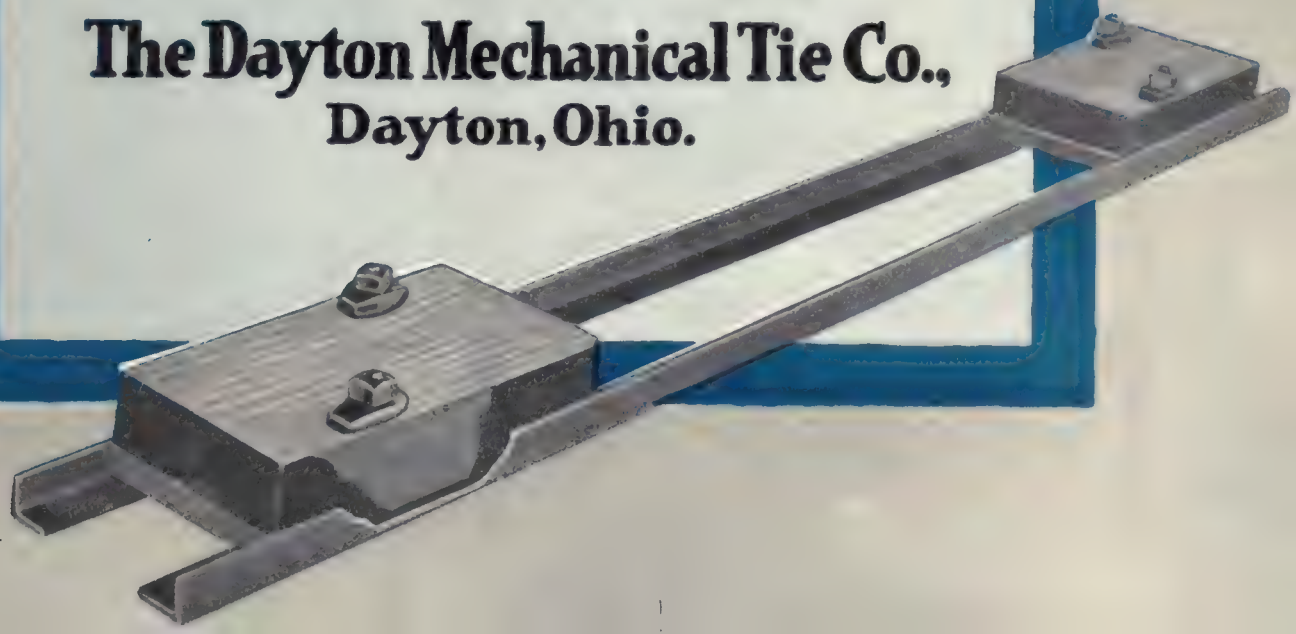
*They don't buy again unless they like it —*

# 80% of Dayton Customers Repeat

*Not Once but Again and Again*

**The Dayton Mechanical Tie Co.,**
**Dayton, Ohio.**

*Dayton Ties Put "Shock Absorbers" Under Your Track*



# 80% of Dayton Mechanical Tie Customers Re-order

WE MIGHT be safe in saying 95% of Dayton customers repeat, because we have a host of new customers who have not yet had time to repeat.

We've found that, taken over a period of years, an overwhelming majority of properties which have bought Dayton Ties once, do so a second, third, fourth, fifth—as many more times as they need new ties.

No property would or could do this unless Dayton Ties had paid in cold dollars and cents.

And repeat orders are *not* replacements of earlier purchases of Dayton Ties. Since the inception of Dayton Tie Track, 15 years ago, none of it has ever failed or cost a penny of maintenance. It has stood up under the heaviest traffic the street railways have to offer.

Permanently smooth track would take a load off your mind—Dayton Shock Absorber Track will give it to you.

*Particulars on request.*

**The Dayton Mechanical Tie Co.,**
**Dayton, Ohio.**

# *Insures* Full Payment for the Service You Render!

**FOR USE ON**

Electric Railways
Steam Railways
Motor Coaches
Ferries
Excursion Boats
Steamships
Toll Bridges
Ticket Offices
Wherever Fare Protection is needed

YOUR schedule may be adequate, your equipment the best, your employees above the average—yet, without rigid, untamperable safeguards thrown around your ticket selling and fare collecting, you are not getting the money due you for the service you render—a "difference" that may be enough to pay big dividends.

You may now have this protection. You can stop the hidden leaks and losses. You can secure a correct accounting of every ticket sold. You can be sure of all the money due you—or know the reason why.

## Unequalled Protection for Tickets Sold and Money Collected

The Ohmer Ticket Printing Register, Type 79, places you in absolute control of the very life blood of your business—the money that is due you from passengers.

It automatically prints tickets as issued—a ticket that is complete in every detail. It also prints on a paper tape inside the register an exact duplicate of the information shown on the ticket. This secret, private, duplicate record is unchangeable and untamperable. Every fare must be properly accounted for—every penny turned in. If a discrepancy exists, it is detected, and responsibility fixed.

## Unequalled Protection for Your Profits

Never before have transportation companies been offered the means so effectively and so positively to fortify themselves against mistakes, carelessness, inefficiency, forgetfulness, and dishonesty—weaknesses in old-fashioned methods that are costing untold thousands of dollars today.

This amazing ticket-printing and fare-protecting achievement warrants your fullest investigation. See how much money it would save you—how it would reduce expenses—how it will increase your profits—how it does so much and yet costs so little. Your asking for full information will not obligate you in the least. Write or wire at once.

OHMER FARE REGISTER COMPANY
DAYTON, OHIO

OHMER
REG. U.S. PAT. OFF.
**Transportation Recording Devices**

OTHER OHMER PRODUCTS: Fare Registers, Fare Boxes, Printing Taximeters, Atco Taximeters, Odometers, Hub Odometers, Recordografs, Industrial Counters.

## DHAMAN

According to the Gujarati, the snake known as the dhaman can bite with both ends.

One particular end he uses on Sunday only.

In other words, being a pious snake, he shuts down the heavy week-day working end and justifies the working of the other end as an "act of necessity."

Which naturally brings up the subject of shutting down machines on Sunday to true up commutators that have been pitted by misapplied carbon brushes.

Of course the pious operator considers this work proper on Sunday as an "act of necessity" . . . but he's mistaken.

For a prescription of Morganite brushes would free him from misapplication and miscommutation . . . and the need for Sunday work.

**Morganite Brush Co., Inc.**

*Main Office and Factory*
*3302-3320 Anable Ave., Long Island City, N. Y.*

DISTRICT ENGINEERS AND AGENTS

*Pittsburgh,* Electrical Engineering & Mfg. Co., 909 Penn Ave.
*Cincinnati,* Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.
*Cleveland,* Electrical Engineering & Mfg. Co., 422 Union Building.
*Baltimore,* O. T. Hall, Sales Engineer, 437-A Equitable Building.
*Revere, Mass.,* J. F. Drummey, 75 Pleasant Street.
*Los Angeles,* Special Service Sales Co., 502 Delta Building.
*San Francisco,* Electrical Engineering Sales Co., 222 Underwood Building, 545 Market Street.
*Toronto, Can.,* Railway & Power Engineering Corp., Ltd., 101 Eastern Ave.
*Montreal, Can.,* Railway & Power Engineering Corp., Ltd., 326 Craig St., West.
*Winnipeg, Can.,* Railway & Power Engineering Corp., Ltd., P. O. Box 325.

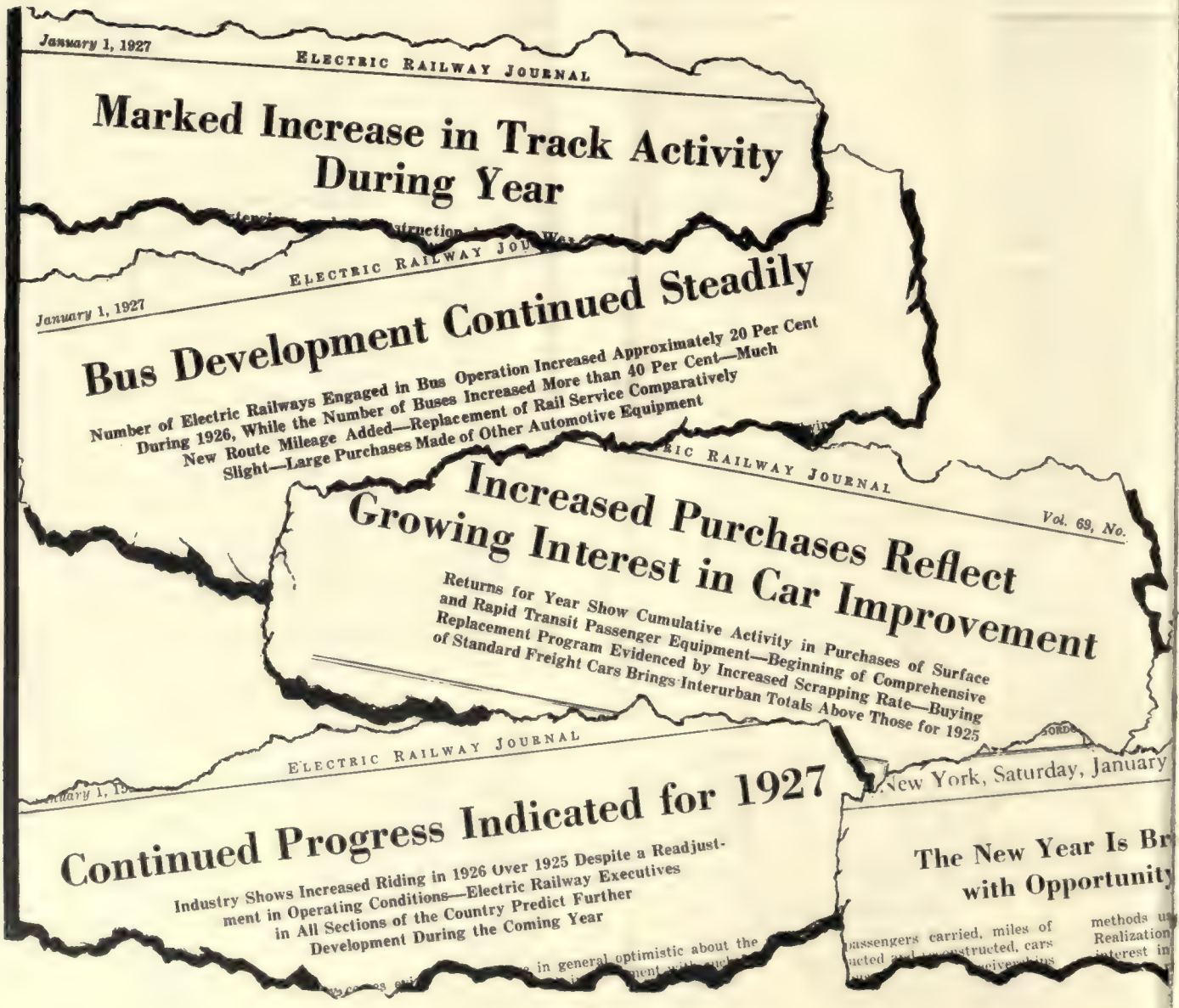
# Coming—*The most complete*

# Annual

A GREAT maintenance year in the electric railway industry is assured. With the economies and profit making possibilities of new cars firmly established, operators all over the country are turning their attention to "Maintenance for the Car Rider."

The appearance of the car, its cleanliness, its smooth uninterrupted operation, the condition of the track, right of way and overhead, all are contributing factors to public good will and increased patronage.

Millions of dollars will be spent this year for shops, for machines, tools and maintenance equipment and supplies.



# Maintenance Number

## *Ever published by Electric Railway Journal*

ELECTRIC railway men are looking eagerly for equipment to increase efficiency, they are seeking tools and devices which make transportation service more attractive, they are intensely interested in equipment that will help them render modern transportation service.

They will look for the latest information on the whole range of maintenance work in the Annual Maintenance Number of *Electric Railway Journal.*

For more than a generation this issue has been a handbook of maintenance fact. This year's issue will contain the greatest gathering of vital information under one cover on this important subject ever published.

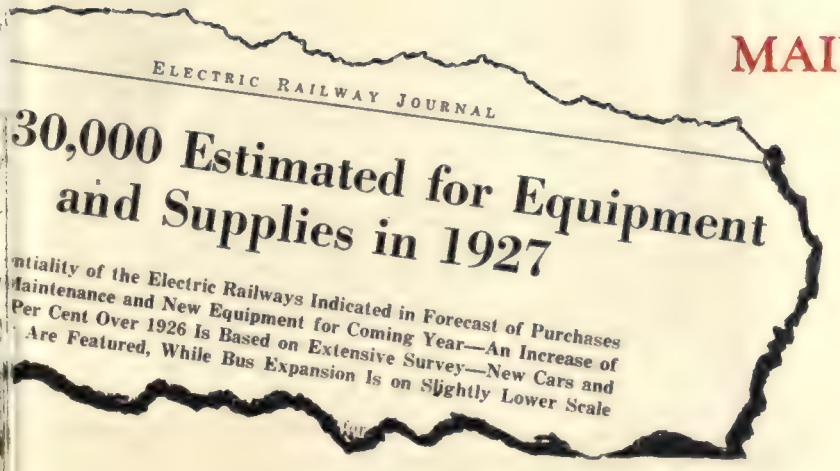
The editorial pages will focus attention on the most modern practices in shop construction and operation, on the most effective policies of track construction and on the most reliable methods of line maintenance.

The advertising pages will focus attention on the leading devices, tools, machines and equipment needed in modern maintenance work.

An entire industry needs and wants manufacturers' assistance. Tell them through an issue that reaches the industry when plans are being considered.

### Last forms close March 14

*Wire your reservation*


ELECTRIC RAILWAY JOURNAL

30,000 Estimated for Equipment and Supplies in 1927

ntiality of the Electric Railways Indicated in Forecast of Purchases
Maintenance and New Equipment for Coming Year—An Increase of
Per Cent Over 1926 Is Based on Extensive Survey—New Cars and
Are Featured, While Bus Expansion Is on Slightly Lower Scale

ANNUAL
MAINTENANCE NUMBER
*March 19, 1927*

# Whatever your requirements

specify

## Le Carbone Carbon Brushes

# They talk for themselves

## W. J. Jeandron

Factory Terminal Bldg.,
Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

Structural Shapes · Steel Sheet Piling
Plates · Skelp
Bars and Bar Mill Products
Bands · Hoops
Axles · Wrought Steel Wheels
Rails · Rail Joints
Steel Cross Ties

## CARNEGIE STEEL COMPANY

*General Offices · Carnegie Building · 434 Fifth Avenue*
PITTSBURGH PENNSYLVANIA

1839



# ELECTRICAL INSULATION

PERFECT MICANITE INSULATOR and PERFECT EMPIRE INSULATOR

Micanite and Super-Micanite Sheets, Commutator Segments, and Commutator Rings

Micanite Tubes and Washers

Linotape, Seamless or Sewn Bias
*(Yellow or Black Varnished Tapes)*

Empire Oiled Cloths and Papers
*(Yellow or Black)*

Compounds, Varnishes, Etc.

*Send for catalog and helpful booklet on Commutator Insulation and Assembly*

## MICA INSULATOR COMPANY

*Largest manufacturers in the world of mica insulation.*
*Established 1893*

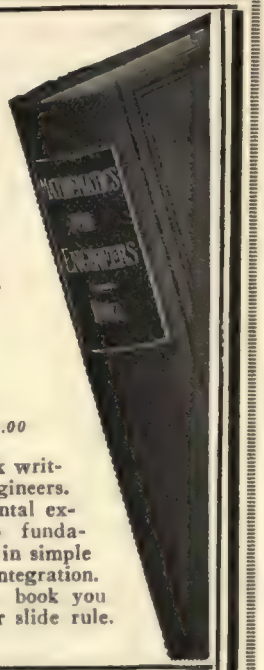
New York: 68 Church St. Chicago: 542 So. Dearborn St.

Cleveland Pittsburgh Cincinnati
San Francisco Los Angeles Seattle

*Works: Schenectady, New York; Victoriaville, Canada; London, England*



# *Just Out!*



FOR reference, for brushing up, or for study—this new book on mathematics for the practicing engineer fills a long-felt need.

## MATHEMATICS FOR ENGINEERS

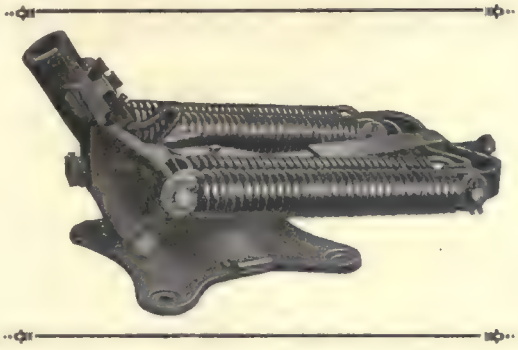
**By Raymond W. Dull**
Consulting Engineer
*780 pages, 6x9, 686 illustrations, $5.00*

HERE is a mathematics handbook written by an engineer for engineers. The book is not encumbered by mental exercises, but gets right down to fundamentals from brain-saving methods in simple addition, to partial and multiple integration. It is a consulting mathematics; a book you will want on your desk beside your slide rule. See it for ten days free.

## FREE EXAMINATION COUPON

McGRAW-HILL BOOK CO., INC., 370 Seventh Ave., New York City
Gentlemen: Send me for ten days' free examination: Dull's MATHEMATICS FOR ENGINEERS, $5.00. I agree to return the book, postpaid, in ten days or to remit for it then.
Name .....
Home Address .....
City ..... State .....
Position .....
Company .....
*(Books sent on approval to retail customers in the United States and Canada only.)*
E 3-5-27

# Do You Think You Could Build a Nuttall Trolley?



You doubtless could if you knew what grade of metal to put in the foot, the swivel, the pole socket, etc.—if you knew where they had to be reinforced to withstand strains and where they had to be lightened to keep down weight; if you knew a reliable foundry that could furnish suitable castings; if you had $60,000 worth of special machinery, tools, jigs, reamers, drills, etc., but even so, if you didn't have 35 years of experience and a crew of skilled mechanics you couldn't *equal* a Nuttall Trolley. So why should you think anyone else could?

Why should you buy just trolley poles, trolley harps, trolley wheels? If they cost less than Nuttall's its poor economy anyhow because they are worth less. And it is worth something *more* to get with your purchase the feeling of confidence inspired by a product you know is *right*.

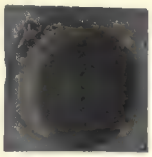
***Buy genuine Nuttall Trolley parts, poles, wheels, harps, from Nuttall.***

**R.D.NUTTALL COMPANY**
**PITTSBURGH PENNSYLVANIA**

**All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.**

MEMBER AERA 1927





## Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

**No-wear Check Pawl**
**Free-Winding Tension Spring**
**Ratchet Wind**
**Emergency Release**
**Perfect Automatic Lubrication**

Earll Catchers and Retrievers

**C. I. EARLL, York, Pa.**

*Canadian Agents:*
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
*In All Other Foreign Countries:*
International General Electric Co., Schenectady, N. Y.



COLUMBIA MACHINE WORKS

# COLUMBIA

## Railway Supplies and Equipment

Machine and Sheet Metal Work

Forgings
Special Machinery and Patterns

Grey Iron and Brass Castings

Armature and Field Coils.

*The*
Columbia Machine Works
*and M. I. Co.*
265 Chestnut St., corner Atlantic Ave., Brooklyn, N. Y.

# Bankers and Engineers


**Ford, Bacon & Davis**
Incorporated
**Engineers**
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

**The J. G. White Engineering Corporation**
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

**STONE & WEBSTER**
Incorporated
EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
New York Boston Chicago

**THE BEELER ORGANIZATION**
Transportation, Traffic, and Operating Surveys
Coordinating Service—Financial Reports
Appraisals—Management
52 Vanderbilt Ave. New York

**SANDERSON & PORTER**
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

**Byllesby Engineering & Management Corporation**
231 S. La Salle Street, Chicago
New York San Francisco

**ALBERT S. RICHEY**
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

**ENGELHARDT W. HOLST**
*Consulting Engineers*
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

**LINN & MARSHALL, *Inc.***
*Financing — Engineering — Management*
PUBLIC UTILITIES
ELECTRIC RAILWAYS — MOTOR BUSES — GAS — ELECTRIC
25 Broadway, New York City

**DAY & ZIMMERMANN, INC.**
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

**STEVENS & WOOD**
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION YOUNGSTOWN, O. FINANCING MANAGEMENT

**WALTER JACKSON**
*Consultant on* Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

**HEMPHILL & WELLS**
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
*APPRAISALS*
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

**KELKER, DELEUW & CO.**
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

C. B. BUCHANAN, President — W. H. PRICE, JR., Sec'y-Treas. — JOHN F. LAYNG, Vice-President
**BUCHANAN & LAYNG CORPORATION**
*Engineering and Management, Construction*
*Financial Reports, Traffic Surveys*
*and Equipment Maintenance*
BALTIMORE 1904 Citizens National Bank Bldg. — Phone: Hanover: 2142 — NEW YORK 49 Wall Street

**McCLELLAN & JUNKERSFELD**
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

# THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

**Builders since 1868 of Water Tube Boilers of continuing reliability**

BRANCH OFFICES

BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

THE BABCOCK & WILCOX COMPANY — STEAM

WORKS
Bayonne, N. J.
Barberton, Ohio

**Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893**

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 444 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

## A. L. DRUM & COMPANY

*Consulting and Constructing Engineers*

VALUATION AND FINANCIAL REPORTS
RATE STUDIES FOR PRESENTATION TO PUBLIC SERVICE COMMISSIONS
CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS

230 South Clark Street, Chicago, Ill.

PS HEATERS

*Car Heating and Ventilating*

—are no longer operating problems. We can show you how to take care of both with one equipment. The Peter Smith Forced Ventilation Hot Air Heater will save, in addition, 40% to 60% of the cost of any other car heating and ventilating system. Write for details.

The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.

## THE P. EDWARD WISH SERVICE

50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

UNA

RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD

UNA Welding & Bonding Co.
Cleveland, Ohio.

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

*Gets Every Fare*

PEREY TURNSTILES or PASSIMETERS

Use them in your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.
101 Park Avenue, New York City

**Transmission Line and Special Crossing Structures, Catenary Bridges**

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

ARCHBOLD-BRADY CO.
Engineers and Contractors — SYRACUSE, N. Y.

DUFF JACKS
TRADE MARK

IT'S LIGHT ON DUFF JACKS
Genuine Barrett Jacks for every purpose
Duff Pinion Puller Safe—Quick—Positive

The Duff Manufacturing Co.
Est. 1883 PITTSBURGH, PA.
BRANCH OFFICES: ATLANTA - CHICAGO - HOUSTON - NEW YORK - ST. LOUIS - SAN FRANCISCO

**ILLINOIS MOTIVE EQUIPMENT COMPANY**

J. D. Elsom, President

RAILWAY AND AUTOMOTIVE SUPPLIES
35 EAST WACKER DRIVE, CHICAGO
*WESTERN REPRESENTATIVES:*
JOHNSON FARE BOXES
METAL TICKETS — COIN CHANGERS

RAILWAY UTILITY COMPANY

CAR COMFORT WITH UTILITY
HEATERS
REGULATORS
VENTILATORS

141-151 West 22d St. Chicago, Ill. — *Write for Catalogue* — 1328 Broadway New York, N. Y.

EIGHT WORKS
RAMAPO-AJAX-ELLIOT
HILLBURN, NEW YORK
NIAGARA FALLS, N.Y.
CHICAGO, ILLINOIS
EAST ST. LOUIS, ILL.
PUEBLO, COLORADO
SUPERIOR, WISCONSIN
LOS ANGELES, CAL.
NIAGARA FALLS, ONT. CANADA

Ramapo Ajax Corporation

RACOR

RAMAPO AUTOMATIC RETURN SWITCH STANDS FOR PASSING SIDINGS
TEE RAIL SPECIAL WORK
MANGANESE WORK A SPECIALTY
SALES OFFICES AT ALL WORKS
*Main Office*, HILLBURN, N.Y.

**Coin Counting and Sorting Machines**

FARE BOXES

Lever-Operated and Slip Change Carriers

The Cleveland Fare Box Co.
Cleveland, Ohio
Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.

# PANTASOTE

Trade Mark

Seat and Curtain Materials

*There is no substitute for Pantasote*

# AGASOTE

Trade Mark

Roofing—Headlining—Wainscoting

*The only homogeneous panel board*

*standard for electric railway cars and motor buses*

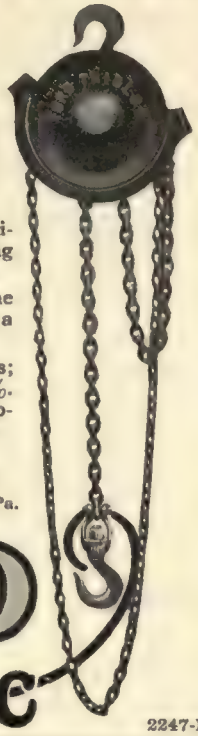
The PANTASOTE COMPANY Inc.

At 46th 250 Park Avenue Street

NEW YORK

People's Gas Bldg., Chicago, Ill.

Tribloc Chain Hoists equipped with our "Ezeejoin" Shackle



This improvement ends the possibility of poor welds when renewing the load chains in Ford Triblocs.

Any handy man can take out the old load chain and replace it with a new one in a few minutes.

The Tribloc Hoist has spur gears; the highest efficiency, which is 80%. Made of malleable iron and drop-forged steel parts throughout.

*Send for Bulletin 4G*

FORD CHAIN BLOCK COMPANY

2nd and Diamond Streets, Philadelphia, Pa.

FORD TRIBLOC

2247-D

R 11 Double Register

*Both our latest single and double registers are now equipped for electric as well as mechanical hand or foot operation.*

## Full Electric Operation of Fare Registers

A completely satisfactory fare registration system is one that has the confidence of the public, the conductor and the accounting department. The simplicity and accuracy of International Registers maintained for more than thirty years, is combined in the later types with the extra speed and convenience of electric operation.

The International Register Co.

15 South Throop St., Chicago



THE WORLD'S STANDARD

# "IRVINGTON"

Black and Yellow

Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing

Insulating Varnishes and Compounds

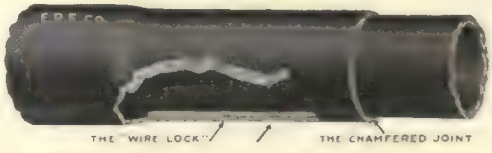
**Irvington Varnish & Insulator Co.**

Irvington, N. J.

*Sales Representatives in the Principal Cities*



ELRECO TUBULAR POLES




COMBINE

Lowest Cost Lightest Weight

Least Maintenance Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.

CINCINNATI, OHIO

New York City, 30 Church Street

# SEARCHLIGHT SECTION

## USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

*Positions Wanted*, 4 cents a word, minimum 75 cents an insertion, payable in advance.

*Positions Vacant* and all other classifications, 8 cents a word, minimum charge $2.00.

*Proposals*, 40 cents a line an insertion.

INFORMATION:

*Box Numbers* in care of any of our offices count 10 words additional in undisplayed ads.

*Discount* of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

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### POSITIONS VACANT

ASSISTANT to engineer, M. of W. graduate. Write experience—salary expected. Box 781, East Liverpool, Ohio.

CORPORATION, manufacturing trucks, buses, desires services capable men engineering, sales, service. State age, education, previous employment, experience, also furnish references. P-978, Electric Railway Journal, Tenth Ave. at 36th St., New York.

ROAD MASTER wanted on Middlewest street railway property; young man with track experience; engineer preferred, to handle division one hundred miles of city track. In answer please give full experience and salary expected. P-971, Electric Railway Journal, Bell Tel. Bldg., St. Louis, Mo.

TRACK foreman, experienced in street railway track and paving work. One who can take full charge of track department for small company. Give age, experience, references and salary expected in first letter. P-975, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

### POSITIONS WANTED

EQUIPMENT engineer and maintenance executive, six years' factory engineering experience and seven years' maintenance work with large railway company, desires change. College graduate with A-1 references. PW-967, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

### POSITIONS WANTED

MASTER mechanic open for a position, eighteen years' experience, both city and interurban cars. Also rebuilding of cars. Best of references. PW-976, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio

MASTER mechanic with 15 years' experience city and interurban cars, buses, automobiles and building maintenance. Electrical engineering graduate. PW-974, Electric Railway Journal, Tenth Ave. at 36th St., New York.

OPERATING official available. Broad experience, fine record of achievements, city and interurban properties, East and Central West. Recognized ability, successful in handling labor, public relations, selling transportation, increasing revenue, accident prevention, solving traffic problems. Progressive, efficient and a worker for results. Fine references. Correspondence and appointments for personal interview invited. PW-977, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

UTILITIES executive available. Engineering graduate, broad operating and executive experience, railway, also light and power. Young and progressive with tried and proven ability. Railway activities known to the industry. At present employed; seek opportunity with larger interests. The opportunity for past successful methods to produce relatively greater results. PW-972, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SAVE 30% TO 50% ON
RAILS-LOCOMOTIVES-CARS
Economy—Service
Quality—Reliability
HYMAN-MICHAELS COMPANY
Peoples Gas Bldg., Chicago
ST. LOUIS — DALLAS — LOS ANGELES
SAN FRANCISCO — PORTLAND — SEATTLE

FOR SALE
15 BIRNEY SAFETY CARS
Brill Built
West. 508 or G. E. 264 Motors
Cars Complete—Low Price—Fine Condition
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

SPECIAL
4 Standard BRILL single truck
BIRNEY CARS
equipped with Westinghouse 508 Motors, DH 16 Air Compressors and all safety devices
$1750.00 each
IRVING S. VAN LOAN CORPORATION
1750 Broadway, New York City

FOR SALE
1000 New Oak Trolley Ties
8 ft. long. Low price. Owner will load on cars ready for shipment.
TACONY HOUSING ASSOCIATION
Tacony, Phila.

## Somewhere—

*there's a buyer for the Equipment you no longer need. Reach him thru an advertisement in the* SEARCHLIGHT SECTION.

## If there is anything you want—

or something you don't want that *other* readers of this paper can supply—or use—advertise in the

**SEARCHLIGHT SECTION**

Somebody is always looking for something to meet certain business needs. Some men in charge of plant operations may be in the market for good used equipment—others may have just what they want, to sell. Some may require a man of unusual qualifications for a particular position—that man may be another reader of this paper!

Put the Searchlight Section to work for you under any of the following classifications—to fill your business needs.

Agencies Wanted
Agents Wanted
Auction Notices
Buildings For Sale
Business Opportunities
Civil Service Opportunities
Contracts To Be Let
Contracts Wanted
Educational Courses
Employment Agencies
Exchanges
For Rent Items
Franchises
Industrial Sites
Miscellaneous Wants
New Industries Wanted
Partners Wanted
Patents For Sale
Patent Attorneys
Plants For Sale
Positions Vacant
Positions Wanted
Property For Sale
Receivers' Sales
Representatives Wanted
Salesmen Wanted
Work Wanted
Etc., Etc., Etc.

# WHAT AND WHERE TO BUY

**Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue**

**Advertising, Street Car**
Collier, Inc., Barron G.

**Air Brakes**
Westinghouse Air Brake Co.

**Anchors, Guy**
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

**Armature Shop Tools**
Columbia Machine Works
Elec. Service Supplies Co.

**Automatic Return Switch Stands**
Ramapo Ajax Corp.

**Automatic Safety Switch Stands**
Ramapo Ajax Corp.

**Axles**
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
Illinois Steel Co.
Standard Steel Works Co.
Westinghouse E. & M. Co.

**Axles (Front and Rear) Motor Truck and Passenger Car**
Timken-Detroit Axle Co., The

**Axles, Steel**
Carnegie Steel Co.

**Axles, Trailer & Motor Bus**
Timken-Detroit Axle Co., The

**Babbitting Devices**
Columbia Machine Works

**Badges and Buttons**
Elec. Service Supplies Co.
International Register Co.

**Barges, Steel**
American Bridge Co.

**Bearings and Bearing Metals**
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
General Electric Co.
Westinghouse E. & M. Co.

**Bearings, Center and Roller Side**
Columbia Machine Works
Stucki Co., A.

**Bearings, Roller**
Timken Roller Bearing Co.

**Bells and Buzzers**
Consolidated Car Heating Co.

**Bells and Gongs**
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
Elec. Service Supplies Co.

**Benders, Rail**
Railway Track-work Co.

**Bodies, Bus**
Brill Co., The J. G.
Cummings Car & Coach Co.
Graham Brothers

**Body Material, Haskelite and Plymetl**
Haskelite Mfg. Corp.

**Boilers**
Babcock & Wilcox Co.

**Boiler Tubes**
National Tube Co.

**Bolts and Nuts, Track**
Illinois Steel Co.

**Bond Testers**
American Steel & Wire Co.
Electric Service Supplies Co.

**Bonding Apparatus**
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

**Bonds, Rail**
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

**Book Publishers**
McGraw-Hill Book Co., Inc.

**Braces, Timber**
Duff Mfg. Co.

**Braces, Trench**
Duff Mfg. Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**
American Bridge Co.
Columbia Machine Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

**Brake Adjusters**
Brill Co., The J. G.
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

**Brake Shoes**
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Wheel Truing Brake Shoe Co.

**Brakes, Brake Systems and Brake Parts**
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Co.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

**Brakes, Magnetic Rail**
Cincinnati Car Co.

**Bridges, Steel**
American Bridge Co.

**Brushes, Carbon**
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co.
Westinghouse E. & M. Co.

**Brushes, Graphite**
Morganite Brush Co.

**Brushholders**
Columbia Machine Works

**Buildings Steel**
American Bridge Co.

**Bulkheads**
Haskelite Mfg. Corp.

**Bunkers, Coal**
American Bridge Co.

**Buses**
Brill Co., The J. G.
Cummings Car Coach Co.
Graham Brothers
International Motor Corp.
Mack Truck, Inc.
Studebaker Corp. of Amer.
Yellow Truck & Coach Co.

**Bushings, Case Hardened and Manganese**
Brill Co., The J. G.
Bemis Car Truck Co.
Cincinnati Car Co.
Columbia Machine Works

**Cables. (See Wires and Cables)**

**Cambric Tapes, Yellow and Black Varnish**
Irvington Varnish & Ins. Co.

**Cambric Yellow and Black Varnish**
Mica Insulator Co.

**Carbon Brushes (See Brushes, Carbon)**

**Car Lighting Fixtures**
Elec. Service Supplies Co.

**Car Panel Safety Switches**
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

**Car Steps, Safety**
Cincinnati Car Co.

**Car Wheels, Rolled Steel**
Bethlehem Steel Co.

**Cars, Dump**
Brill Co., The J. G.
Differential Steel Car Co. Inc.

**Cars, Gas-Electric**
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

**Cars, Gas, Rail**
Brill Co., The J. G.

**Cars, Passenger, Freight, Express, etc.**
Amer. Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
Wason Mfg. Co.

**Cars, Second Hand**
Electric Equipment Co.

**Cars, Self-Propelled**
Brill Co., The J. G.
General Electric Co.

**Castings, Brass Composition or Copper**
Cincinnati Car Co.
Columbia Machine Works

**Castings, Gray Iron and Steel**
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia Machine Works
Standard Steel Works Co.

**Castings, Malleable & Brass**
Bemis Car Truck Co.
Columbia Machine Works

**Catchers and Retrievers, Trolley**
Earll, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

**Catenary Construction**
Archbold-Brady Co.

**Ceiling Car**
Haskelite Mfg. Corp.
Pantasote Co., Inc.

**Ceilings, Plywood, Panels**
Haskelite Mfg. Corp.

**Cement**
N. Amer. Cement Corp.

**Cement Accelerator**
N. Amer. Cement Corp.

**Chairs, Parlor Car**
Heywood-Wakefield Co.

**Change Carriers**
Cleveland Fare Box Co.
Electric Service Supplies Co.
Illinois Motive Equipment Co.

**Change Trays**
Cincinnati Car Co.

**Circuit-Breakers**
General Electric Co.
Westinghouse E. & M. Co.

**Clamps and Connectors for Wires and Cables**
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

**Cleaners and Scrapers, Track (See also Snow-Plows, Sweepers and Brooms)**
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.

**Clusters and Sockets**
General Electric Co.

**Clutches**
Long Mfg. Co.

**Coal and Ash Handling (See Conveying and Hoisting Machinery)**

**Coil Banding and Winding Machines**
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse Elec. & M. Co.

**Coils, Armature and Field**
Columbia Machine Works
Economy Electric Devices Co.
General Electric Co.
Westinghouse E. & M. Co.

**Coils, Choke and Kicking**
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

**Coin Counting Machines**
Cleveland Fare Box Co.
International Register Co.

**Coin Sorting Machines**
Cleveland Fare Box Co.

**Coin Wrappers**
Cleveland Fare Box Co.

**Commutator Slotters**
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

**Commutator Truing Devices**
General Electric Co.

**Commutators or Parts**
Cameron Electrical Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

**Compressors, Air**
General Electric Co.
Westinghouse Tr. Br. Co.

**Condensers**
General Electric Co.
Westinghouse E. & M. Co.

**Condensor Papers**
Irvington Varnish & Ins. Co.

**Connectors, Solderless**
Westinghouse E. & M. Co.

**Connectors, Trailer Car**
Columbia Machine Works
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

**Controllers or Parts**
Columbia Machine Works
General Electric Co.
Westinghouse E. & M. Co.

**Controller Regulators**
Elec. Service Supplies Co.

**Controlling Systems**
General Electric Co.
Westinghouse E. & M. Co.

**Converters, Rotary**
General Electric Co.
Westinghouse E. & M. Co.

**Conveying & Hoisting Machinery**
American Bridge Co.

**Copper Wire**
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

**Copper Wire Instruments, Measuring, Testing and Recording**
American Brass Co., The
American Steel & Wire Co.
Anaconda Copper Mining Co.

**Cord, Bell, Trolley, Register, etc.**
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works

**Cord Connectors and Couplers**
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

**Couplers, Car**
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

**Cranes, Hoists & Lifts**
Buda Co., The
Electric Service Supplies Co.

**Cross Arms (See Brackets)**

**Crossings**
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

**Crossing Foundations**
International Steel Tie Co.

**Crossings, Frog and Switch**
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

**Crossings, Manganese**
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

**Crossing Signals. (See Signal Systems, Highway Crossing)**

**Crossings, Track (See Track, Special Work)**

**Crossings, Trolley**
Ohio Brass Co.
Westinghouse E. & M. Co.

**Curtains & Curtain Fixtures**
Brill Co., The J. G.
Pantasote Co., Inc.

**Dealer's Machinery & Second Hand Equipment**
Elec. Equipment Co.
Hyman-Michaels Co.
Van Loan Corp., Irving S.

**Derailing Switches**
Ramapo Ajax Corp.

**Destination Signs**
Columbia Machine Works
Elec. Service Supplies Co.

**Detective Service**
Wish Service, Edward P.

**Door Operating Devices**
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heat. Co.
National Pneumatic Co.

**Doors & Door Fixtures**
Brill Co., The J. G.
Cincinnati Car Co.
General Electric Co.
Hale-Kilburn Co.

**Doors, Folding Vestibule**
National Pneumatic Co.

**Drills, Track**
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.

**Dryers, Sand**
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Ears**
Columbia Machine Works
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

**Electric Grinders**
Railway Track-work Co.

**Electric Rivet Heaters**
American Car & Foundry Co.

**Electric Transmission Towers**
American Bridge Co.

**Electrical Wires and Cables**
Amer. Electrical Works
Amer. Steel & Wire Co.
John A. Roebling's Sons Co.

**Electrodes, Carbon**
Railway Track-work Co.
Una Welding & Bonding Co.

**Electrodes, Steel**
Railway Track-work Co.
Una Welding & Bonding Co.

**Enamel**
Duco, E. I. Du Pont de Nemours Co.

**Engineers, Consulting, Contracting and Operating**
Archbold-Brady Co.
Beeler, John A.
Buchanan & Layng Corp.
Byllesby & Co., H. M.
Day & Zimmermann, Inc.
A. L. Drum & Co.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Linn & Marshall Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.

**Engines, Gas, Oil and Steam**
Westinghouse E. & M. Co.

**Engines, Gasoline**
Continental Motors Co.

**Exterior Side Panels**
Haskelite Mfg. Corp.

**Fare Boxes**
Cleveland Fare Box Co.
Economy Electric Devices Co.
Illinois Motive Equipment Co.
Ohmer Fare Register Co.
Perey Mfg. Co.

**Fare Registers**
Elec. Service Supplies Co.
Ohmer Fare Register Co.

**Fences, Woven Wire and Fence Posts**
Amer. Steel & Wire Co.

**Fenders and Wheel Guards**
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
Star Brass Works
Wood Co., Chas. N.

**Fibre and Fibre Tubing**
Westinghouse E. & M. Co.

**Field Coils (See Coils)**

**Flangeway Guards, Steel**
Godwin Co., Inc., W. S.

**Floodlights**
Elec. Service Supplies Co.

**Floor, Sub**
Haskelite Mfg. Corp.

**Floors**
Haskelite Mfg. Corp.

**Forgings**
Brill Co., The J. G.
Cincinnati Car Co.
Duff Mfg. Co.
Standard Steel Works Co.

**Frogs & Crossings, Tee Rail**
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

**Frogs, Track (See Track Work)**

**Frogs, Trolley**
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

**Furnaces, Electric, Steel Melting**
American Bridge Co.

**Fuses and Fuse Boxes**
Columbia Machine Works
Consolidated Car Heat. Co.
General Electric Co.
Westinghouse E. & M. Co.

**Fuses, Refillable**
General Electric Co.

(Continued on page 64)

# AMERICAN BRIDGE COMPANY

EMPIRE BUILDING—71 BROADWAY NEW YORK, N. Y.

*Manufacturers of Steel Structures of all classes particularly* BRIDGES AND BUILDINGS

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS FOR ELECTRIC TRANSMISSION, HEROULT ELECTRIC FURNACES, ETC.

SALES OFFICES:

NEW YORK, N.Y. Philadelphia, Pa. Boston, Mass. Baltimore, Md.

PITTSBURGH, PA. Cincinnati, Ohio Cleveland, Ohio Detroit, Mich.

CHICAGO, ILL. St. Louis, Mo. Denver, Colo. Salt Lake City, Utah Duluth, Minn. Minneapolis, Minn.

Pacific Coast Representative: U.S. Steel Products Co., Pacific Coast Dept. San Francisco, Cal. Los Angeles, Cal. Portland, Ore. Seattle, Wash.

Export Representative: United States Steel Products Co., 30 Church Street, New York.

# Lorain Special Trackwork Girder Rails

*Electrically Welded Joints*

THE LORAIN STEEL COMPANY

Johnstown, Pa.

*Sales Offices:*

Atlanta Chicago Cleveland New York Philadelphia Pittsburgh Dallas

*Pacific Coast Representative:*

United States Steel Products Company

Los Angeles Portland San Francisco Seattle

*Export Representative:*

United States Steel Products Company, New York, N. Y.

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

# National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York

BRANCH OFFICES

Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Feasible Drop Brake Staffs
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Anderson Slack Adjusters
Economy Electric Devices Co., Power Saving and Inspection Meters
"Topeseald" Lamps
Bus Lighting Equipment
Cowdrey Automotive Brake Testing Machine

# Wharton Special Trackwork

Trackwork of superior quality, incorporating the famous Tisco Manganese Steel.

WM. WHARTON JR. & CO., Inc.
EASTON, PA.

OFFICES:

Boston Chicago El Paso Montreal New York Philadelphia Pittsburgh San Francisco Scranton

BUDA ESTABLISHED 1881

Special Track Work of every description

# THE BUDA COMPANY

Harvey (Suburb Chicago) Illinois

When ordering new equipments it will pay you to specify

## "TOOL STEEL" Gears and Pinions

The quality never varies

"TOOL STEEL" Gears and Pinions are established throughout the world as the STANDARD OF QUALITY

The Tool Steel Gear & Pinion Company

Cincinnati Ohio

**Gaskets**
Westinghouse Tr. Br. Co.

**Gasoline Torches**
Economy Electric Devices Co.

**Gas Producers**
Westinghouse E. & M. Co.

**Gates, Car**
Brill Co., The J. G.
Cincinnati Car Co.

**Gauges, Oil and Water**
Ohio Brass Co.

**Gear Blanks**
Brill Co., The J. G.
Standard Steel Works Co.

**Gear Cases**
Chillingworth Mfg. Co.
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

**Gears and Pinions**
Bemis Car Truck Co.
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

**Generating Sets, Gas-Electric**
General Electric Co.

**Generators**
General Electric Co.
Westinghouse E. & M. Co.

**Girder Rails**
Bethlehem Steel Co
Lorain Steel Co.

**Gongs (See Bells and Gongs)**

**Greases (See Lubricants)**

**Grinders & Grinding Supplies**
Metal & Thermit Corp.
Railway Track-work Co.

**Grinders, Portable**
Railway Track-work Co.

**Grinders, Portable Electric**
Railway Track-work Co.

**Grinding Bricks and Wheels**
Railway Track-work Co.

**Guard Rail Clamps**
Ramapo Ajax Corp.

**Guard Rails, Tee Rail & Manganese**
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

**Guards, Trolley**
Elec. Service Supplies Co.
Ohio Brass Co.

**Harps, Trolley**
Columbia Machine Works
Elec. Service Supplies Co.
Nuttall Co., R. D.
Star Brass Works

**Headlights**
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

**Headlining**
Columbia Machine Works
Haskelite Mfg. Corp.
Pantasote Co., Inc.

**Heaters, Car (Electric)**
Consolidated Car Heat. Co.
Economy Electric Devices Co.
Gold Car Heat. & Ltg. Co.
Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water**
Smith Heater Co., Peter

**Heaters, Car, Stove**
Smith Heater Co., Peter

**Heaters, Electric Rivet**
American Car & Foundry Co.

**Helmets, Welding**
Railway Track-work Co.
Una Welding & Bonding Co.

**Hoists & Lifts**
Columbia Machine Works
Ford Chain Block & M. Co.

**Hose, Bridges**
Ohio Brass Co

**Hose, Pneumatic**
Westinghouse Tr. Br. Co.

**Instruments, Measuring, Testing and Recording**
American Steel & Wire Co.
Economy Electric Devices Co.
General Electric Co.
Westinghouse E. & M. Co.

**Insulating Cloth, Paper and Tape**
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
U. S. Rubber Co.
Westinghouse E. & M. Co.

**Insulating Machinery**
Amer. Ins. Machinery Co.

**Insulating Silk**
Irvington Varnish & Ins. Co.

**Insulating Varnishes**
Irvington Varnish and Insulating Co.

**Insulation (See also Paints)**
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
U. S. Rubber Co.
Westinghouse E. & M. Co.

**Insulation Slot**
Irvington Varnish & Ins. Co.

**Insulator Pins**
Elec. Service Supplies Co.
Hubbard & Co.

**Insulators (See also Line Materials)**
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

**Interior Side Linings**
Haskelite Mfg. Corp.

**Interurban Cars (See Cars, Passenger, Freight, Express, etc.)**
Cummings Car & Coach Co.

**Jacks (See also Hoists and Lifts)**
Buda Co., The
Columbia Machine Works
Duff Mfg. Co.
Elec. Service Supplies Co.

**Jacks, Automatic Lowering**
Duff Mfg. Co.

**Jacks, Ball Bearing Screw**
Duff Mfg. Co.

**Jacks, Governor Controlled**
Duff Mfg. Co.

**Jacks, Horizontal**
Duff Mfg. Co.

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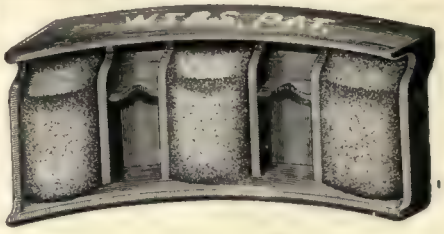

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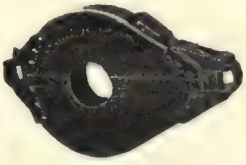

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Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.

**Truss Planks**
Haskelite Mfg. Corp.

**Tubing, Steel**
National Tube Co.

**Tubing, Yellow & Black Flexible Varnishes**
Irvington Varnish & Ins. Co.

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General Electric Co.
Westinghouse E. & M. Co.

**Turnstiles**
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.

**Turntables**
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**Varnishes (See Paints, etc)**

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National Ry. Appliance Co.

**Ventilators, Car**
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Railway Utility Co.

**Vestibule Linings**
Haskelite Mfg. Corp.

**Welded Rail Joints**
Lorain Steel Co.
Metal & Thermit Corp.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

**Welders, Portable Electric**
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

**Welders, Rail Joint**
Ohio Brass Co.
Railway Track-work Co.

**Welding Processes and Apparatus**
General Electric Co.
Metal & Thermit Corp.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co

**Welding Steel**
Railway Track-work Co.
Una Welding & Bonding Co.

**Welding Wire**
American Steel & Wire Co.
General Electric Co.
Railway Track-work Co.
Roebling's Sons Co., J. A.

**Welding Wire and Rods**
Railway Track-work Co.

**Wheels, Car, Steel & Steel Tired**
American Steel Foundries
Bemis Car Truck Co.
Carnegie Steel Co.
Illinois Steel Co.
Standard Steel Works Co.

**Wheel Guards (See Fenders and Wheel Guards)**

**Wheel Grinders**
Wheel Truing Brake Shoe Co.

**Wheel Presses (See Machine Tools)**

**Wheels, Trolley**
Columbia Machine Works
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Elec. Service Supplies Co.
General Electric Co.
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Star Brass Works

**Wheels, Wrought Steel**
Carnegie Steel Co.
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**Whistles, Air**
General Electric Co.
Ohio Brass Co.
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**Window Guards and Fittings**
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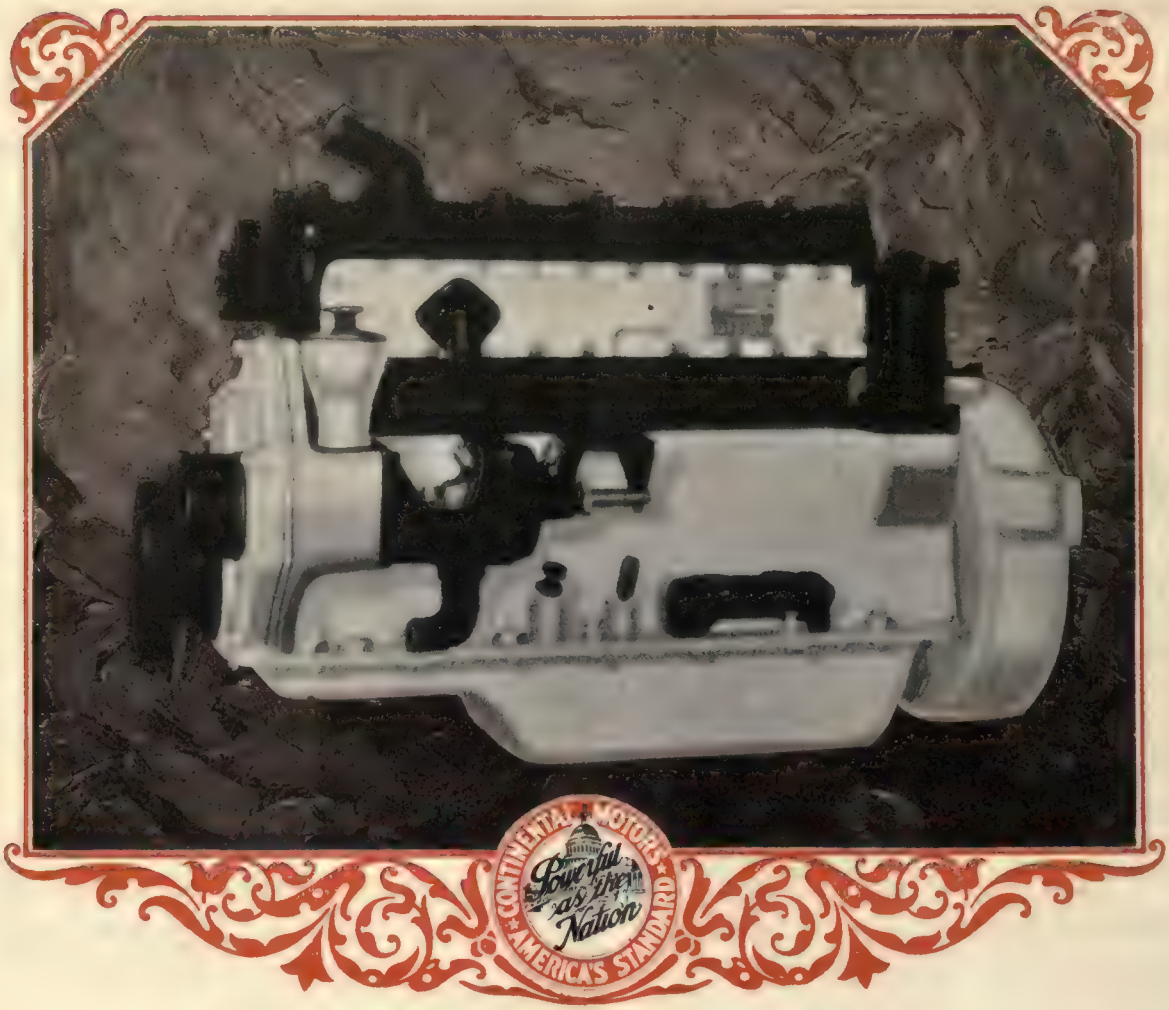



# The Bus and Its Power Plant

Power is the first essential to bus operation—power ready to be unleashed at the driver's need—power that is unfailing on the long run over smooth or rough going.

Economical bus operation is dependent mainly on the power plant. Because Red Seal Continental Motors for bus service are built to specified requirements, they not only insure economy of operation, but a long lasting power plant.

And motor specialists have devoted a quarter century to developing these to their present high standards of dependable performance.

*Specify Continental*

CONTINENTAL MOTORS CORPORATION
*Offices:* Detroit, Mich., U.S.A. *Factories:* Detroit and Muskegon
*The Largest Exclusive Motor Manufacturer in the World*

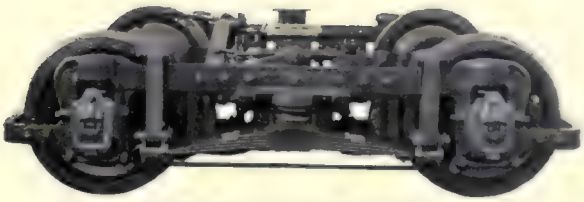
# Continental Motors

# WHEELING'S NEW CARS

## Brill Equipped

Deep spring leather upholstered seats, genuine mahogany finish, dome lighting, and rubber floor covering harmonize in a very attractive interior.

Brill No. 201-B Seat, with reversing mechanism particularly designed to afford a most comfortable slope to cushion and pitch to back.



Brill 177-E Truck equipped with Brill Twin Links

## Latest developments embodied in modern cars' equipment

The fifteen light-weight one-man two-man cars recently built by Kuhlman for the Wheeling Public Service Company are not only mounted on Brill 177-E trucks, equipped with twin links, as well as the numerous other patented Brill devices contributing to their smooth and steady riding action, but also include Brill No. 201-B seats and Brill Vertical Handle Brakes, specialties primarily developed to provide necessary comfort and efficient service so essential to modern cars of this type.

BRILL

**The J. G. Brill Company**
Philadelphia

American Car Company
St. Louis

The G. C. Kuhlman Car Co.
Cleveland

Wason Mfg. Company
Springfield, Mass.

Brill Vertical Handle Brake

# GAS-ELECTRIC DRIVE

## *What about the weight ?*

Forward steps in bus construction generally increase the weight. Witness pneumatic tires and six cylinders.

Gas-Electric Drive means added weight but—the difference is negligible when you consider the greater net return. More bus miles per day, more riders per bus, lower maintenance and depreciation costs—inevitable results of Gas-Electric drive—have more than compensated for weight increases in every case.

# GENERAL ELECTRIC

Hill Publishing Company, Inc. March 12, 1927 Twenty Cents per Copy

# ELECTRIC RAILWAY JOURNAL


## Progress

At every point on this map new manufacturing facilities and an added source of engineering information have been provided during the past year.

The introduction into America of the Mercury-Arc Power Rectifier is one interesting example of the benefit of this development.

American Brown Boveri Electric Corporation
Camden, New Jersey

See Pages 17-20 inclusive for details

# Hauling Crowds
## —*Without Crowding*

OUT of this apparent paradox—hauling crowds without crowding—is dawning the new era of profitable street railway operation. The truth of it is being demonstrated in more and more cities and communities. Almost every week some railway company makes available facts and figures that indicate the wisdom of far-sighted planning and management.

And if you will delve far enough into these data, you usually will see that "hauling crowds without crowding" is not so inconsistent after all; modern, easily-handled cars attract the patronage. Modern, easily-handled and *comfortable* cars take the curse out of crowding—so far as it can be taken out.

And the public—at heart being considerate and appreciative of well-directed effort for transportation efficiency—rides and pays.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries

MEMBER AERA 1927

**Westinghouse**

X90142

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# ELECTRIC RAILWAY JOURNAL

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*Vol.* 69
*No.* 11

*Pages*
443-478

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# *Milestones on the Road To Greater Profits*

THROUGH lower operating and maintenance costs, a more efficient use of power, and increased patronage—there lies the road to greater profits.

And each Westinghouse automatic substation installed on your system is a milestone along that road.

Operating costs are lower because operators are not needed. A periodical inspection is all the attendance that is necessary. Maintenance costs are less because the automatic switching equipment cannot err, and it furnishes complete protection against all trouble-causing conditions.

A saving in power is effected because the sub-station is on the line only when the load demands it.

Increased patronage results from the better service made possible through better voltage conditions.

If your system is feeling the effects of the keen competition in this era of high-speed transportation, it is time to call in a Westinghouse representative and find out what automatics can do for you.

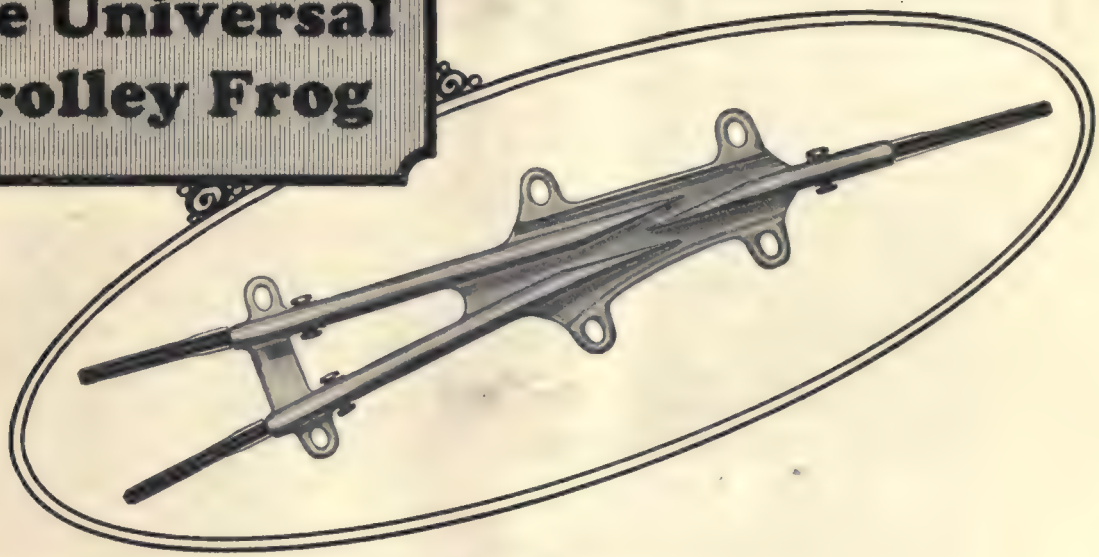
Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1927

**Westinghouse**

X91050

# Type BC— the Universal Trolley Frog



# Used on any Curve— Stays up Longer

**O-B CAM TIPS**
**(Renewable Bronze)**

Are incorporated in the design of all the latest type trolley frogs and crossings. Cam Tips afford an unusually smooth approach to malleable iron special work. They are easily and quickly installed and never become loose or troublesome on the wire. When worn they may be renewed, without displacing the wire or the need of special work.

BETTER results may be obtained at almost any turnout by the use of the Type BC Trolley Frog. Because of its design it may be located nearer the switch point, which reduces the side drag, or angular movement, of the trolley wheel. This means longer life for both the frog and the adjacent trolley wire.

It may be properly located over a wide range of curve turnouts merely by shifting it ahead or back on the tangent track so that the trolley wheels assume approximately the same angle on the frog when engaging the turnout runner.

Runners of liberal height, overlapping at the center of the frog, guide the wheel into the curve smoothly and quietly. There is no jump or arc since runners provide a continuous bearing. The wheel rides on its groove all the way through the BC Frog. At no point do the flanges touch the frog pan, consequently there is no rapid wear.

Service records of as high as 652,500 car passes and a long list of satisfied users tell the story. May we send you complete details? Address

**Ohio Brass Company, Mansfield, Ohio**
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
329B

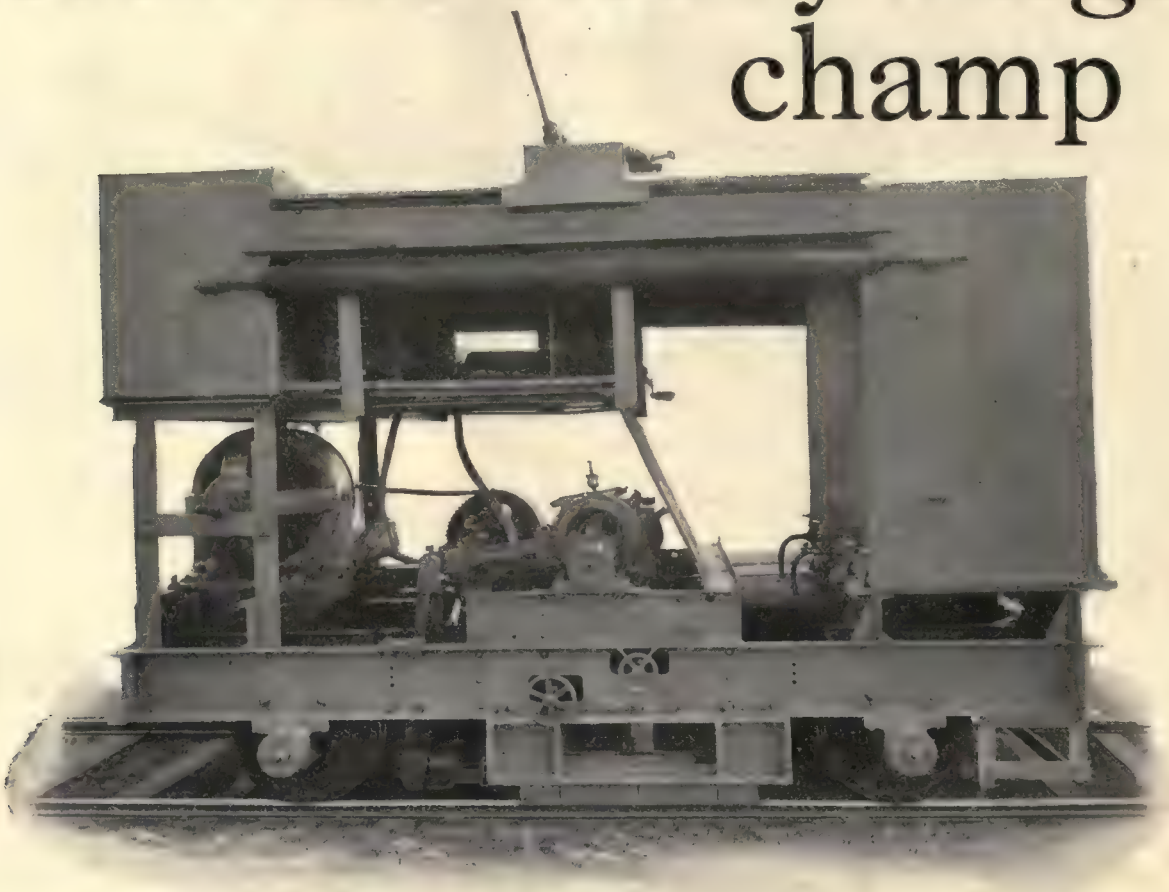
# Ohio Brass Co.

SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

SAVING THE RAIL SAVES THE RAILWAY

# Meet the heavyweight champ



## Heavy Duty Reciprocating Grinder

Perhaps yours is one of the big roads on which it's almost impossible to grind out corrugations as fast as new ones appear. Perhaps a lot of your rail is corrugated and you want to smooth the way so that you can sell comfortable rides. In either case, this Heavy Duty Reciprocating Grinder was made for you.

Six abrasive bricks on each rail are reciprocated by a rocker arm movement with an 8-inch stroke, 150 strokes per minute. There's a 50 H.P. motor to do the job.

The car is propelled by a standard 25 H.P. motor. Water storage tanks hold 1000 gallons. The whole outfit weighs approximately 20,000 pounds. A crew of three can do all the work.

*A word from you brings complete details and a quotation.*

**Railway Track-work Co.**

3132-48 East Thompson Street, Philadelphia

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O.S.T. 1511

SAVING THE RAIL SAVES THE RAILWAY

# *New Cars Need New Track*

NEW track in pavement need no longer be a financial catastrophe now that new cars have shown the way to profitable operation and such low first costs are being obtained with Twin Tie construction.

Look up the money saving possibilities of Twin Tie construction in your "Paved Track Notebook" and send for a delivered price on standard or renewable type Twin Ties expressed in cost per track foot for use with the man-hour detailed estimate sheet furnished with the Notebook. It takes into account your local conditions affecting labor rate and local material costs. Write *today* for price on Twin Ties delivered at your material yard.

*The* INTERNATIONAL STEEL TIE COMPANY, Cleveland, Ohio

Renewable Track? Rail Tilting? Rigidity? Flexibility? Noise? Old Concrete Base? Costs? Bearing? Construction Methods?

*Look it up in your "Paved Track Note Book"*

# Steel Twin Tie Track

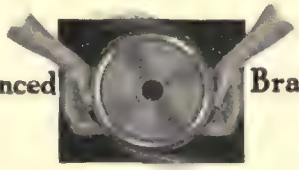
# Would you try to row a boat with one oar?

It can be done, but the inefficiency of steering against the turning effect of the one-sided force is obvious.

Similarly, balanced braking (the double shoe clasp type) is vastly superior to the single brake shoe rigging. The heavy braking load is equally balanced on opposite sides of the wheel. There is no shifting of the journal box bearing; no unbalanced load on truck frames and truck springs; less brake shoe wear; less journal box wear; fewer hot boxes; fewer slid-flat wheels; smoother and shorter stops; less train resistance in starting.

In other words, dozens of advantages—all making for economy and better transportation service.

AMERICAN MULTIPLE-UNIT
CLASP BRAKES




**AMERICAN STEEL FOUNDRIES**

NEW YORK CHICAGO ST. LOUIS

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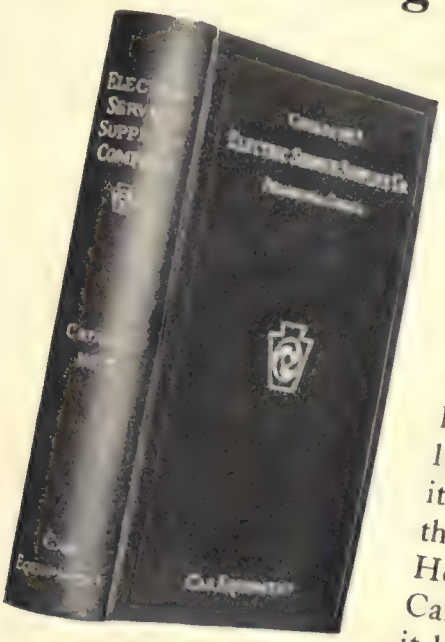

To increase patronage, add attractiveness and efficiency to your cars by selecting your equipment from the broad line of Keystone Car Specialties.

## ESSCO Catalog No. 7

In ESSCO Catalog No. 7 you will find hundreds of devices, parts and supplies—listed, described and illustrated. Whether it is the tiniest screw in a Faraday Buzzer, the lens or reflector for a Golden Glow Headlight or any other part of Keystone Car Equipment you can identify and order it by the catalog number.

*Write for your copy of Catalog No. 7*
*Keep it always on hand for ready reference.*

# ELECTRIC SERVICE SUPPLIES CO.

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# WESTINGHOUSE "VARIABLE LOAD" BRAKE

## gives Uniform Braking with Varying Load

STABILIZED STOPABILITY throughout the entire range of car-loading means—

—safe and swift car movement, through congested districts;

—ability to hold traffic position with other moving vehicles, inasmuch as peak speed can be held longer between stops;

—a precise and systematic movement of shopping and business crowds;

—seconds saved, that may collectively be counted as dollars;

—stimulation of public good will, through a gratifying on schedule record over the entire system.

Many traction companies, recognizing the auspicious part Westinghouse Variable Load Brakes can play in effecting these far-reaching advantages, are specifying this new type equipment for their new modern light weight cars.

**Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office—**

***Ask for Descriptive Catalogue T-2045.***

**Westinghouse Traction Brake Company**
**General Offices and Works: Wilmerding, Pa.**

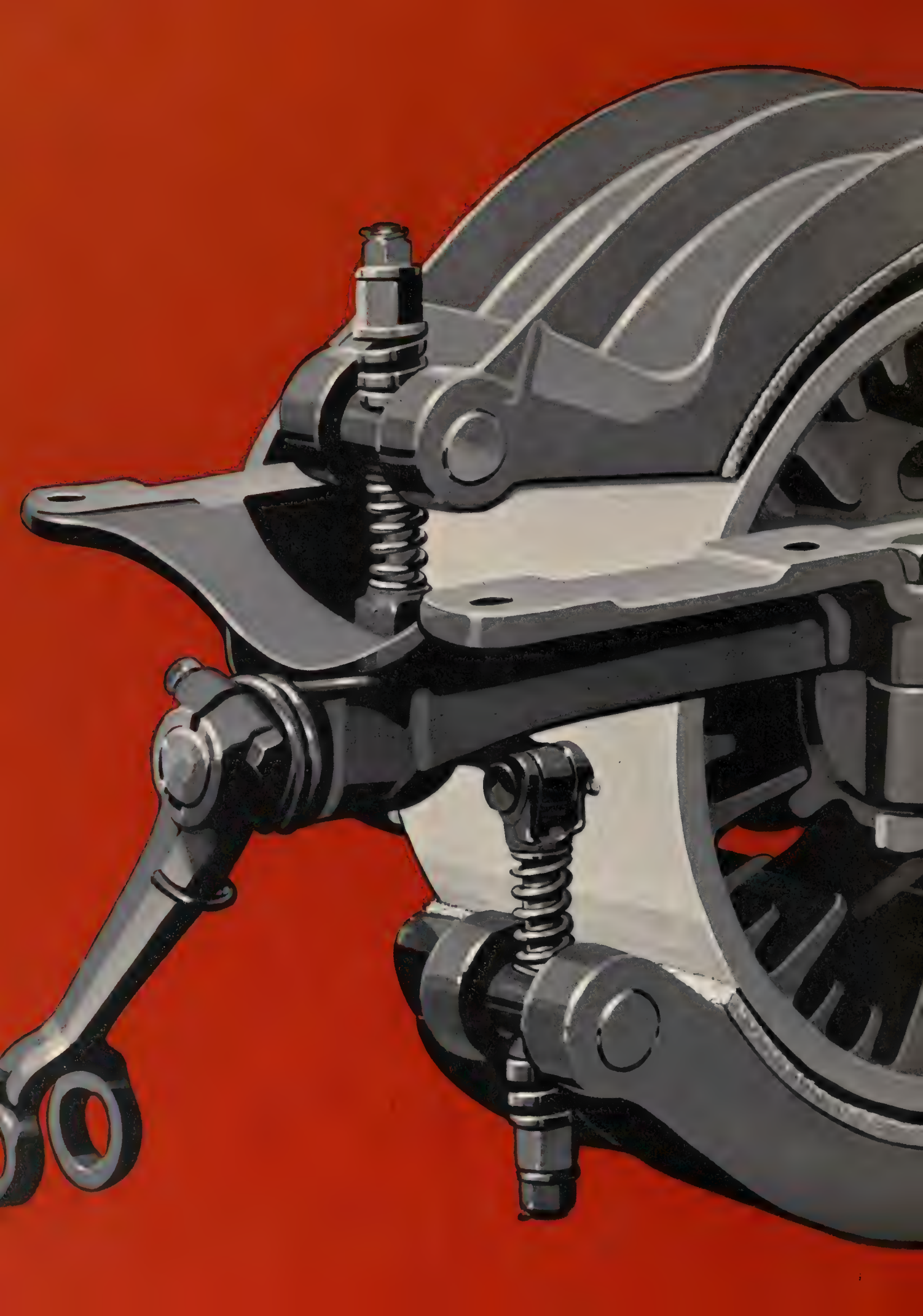
# WESTINGHOUSE TRACTION BRAKES

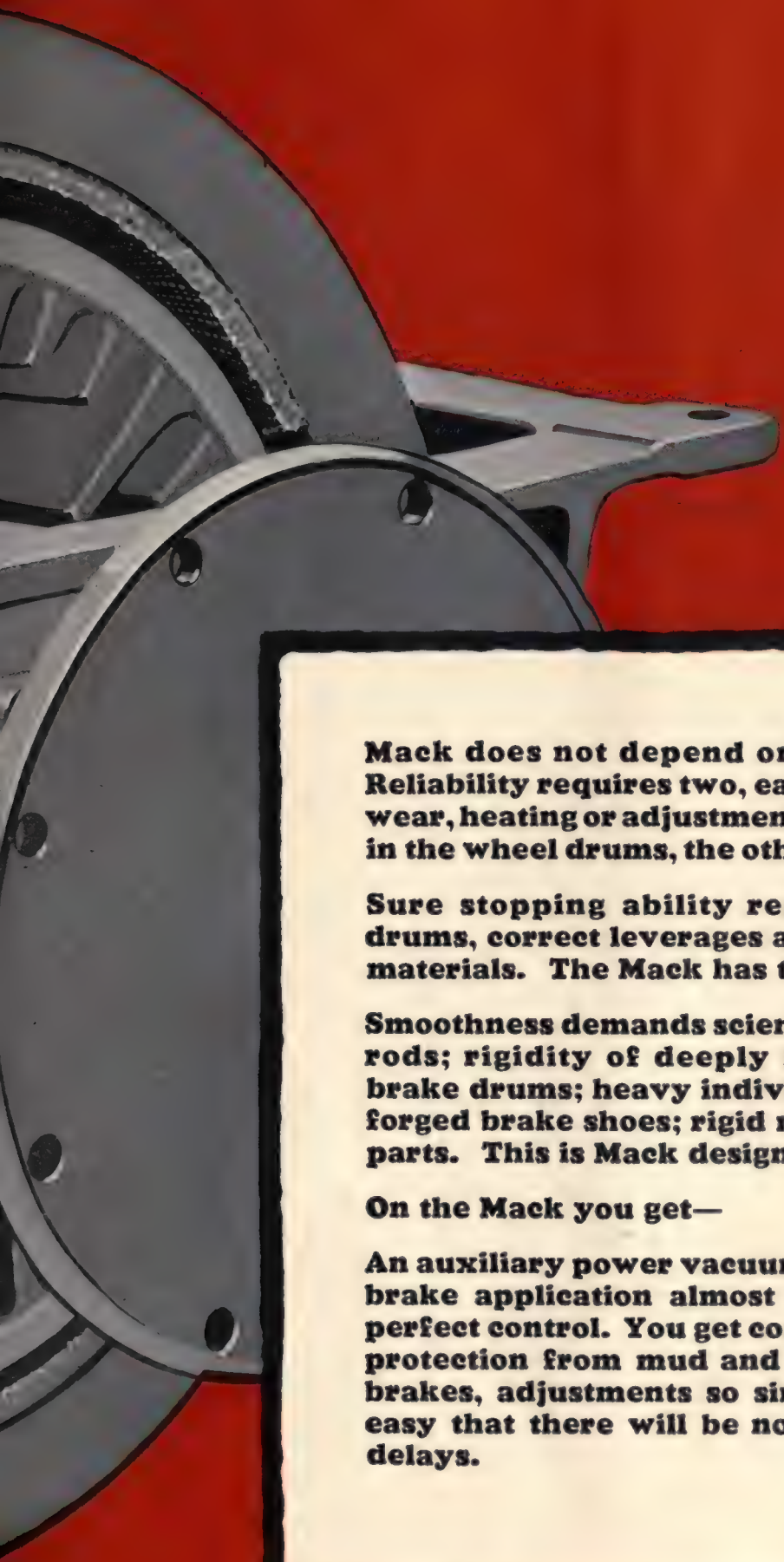
# Such Reliable Brakes!

For safety, good schedules, good tempered, alert and confident drivers a bus must have good brakes.

Brakes that work smoothly, effectively easily and are reliable.

Mack has them.





Mack does not depend on one set of brakes. Reliability requires two, each unaffected by the wear, heating or adjustment of the other. One set in the wheel drums, the other on the driveshaft.

Sure stopping ability requires ample sized drums, correct leverages and the right friction materials. The Mack has these.

Smoothness demands scientific lay-out of brake rods; rigidity of deeply flanged and ribbed brake drums; heavy individually-hinged drop-forged brake shoes; rigid mounting of all brake parts. This is Mack design.

On the Mack you get—

An auxiliary power vacuum booster that makes brake application almost effortless. You get perfect control. You get complete inclosure and protection from mud and water for the wheel brakes, adjustments so simple, accessible and easy that there will be no cause for operating delays.

The Tampa Electric Company Provides City Transportation
For The Residents of Tampa, Florida with MACK Buses

# Putting Brakes on Expenditures!

**An operator with a fleet of over a hundred buses of several makes reports that for shop labor and parts alone his Macks run for 3c. less a mile than any make he has—and as much as 5c. less than some others. Who can figure in such service, what they saved in operating hours—itself worth more than the saving in maintenance costs?**

**This saving—this economy—making larger profits possible, explains why Macks breed so rapidly.**

**On Stone & Webster properties, in Florida, in Richmond, on the Pacific Coast, in City and in Interurban Service—Macks are used.**

**They will tell you that Mack Brakes with their easy adjustment—their long life—their positive control and ease of application, contribute their share to making the Mack the economy bus.**

## Mack Trucks, Inc.

**International Motor Company**
**25 Broadway, New York City**

# STREETS ARE FOR MOVING TRAFFIC—

# *NOT* FOR STORAGE

THE congestion of boarding and alighting passengers slows car movement and makes a standing street car even more of a public nuisance than a parked automobile. To keep cars moving, equip them with the most modern loading and unloading apparatus. National Pneumatic Door and Step Controlling Systems are adaptable to all conditions and afford the most rapid and efficient circulation of passengers in all types of one and two-man service.

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NATIONAL PNEUMATIC COMPANY

*Executive Office:* 50 Church Street, New York

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518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

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1010 Colonial Trust Building

# The simple way to a perfect result

Any rail joint—no matter how good—is still a joint. There's a gap no matter how small. There's a rough spot, no matter how much care is taken. Bar plates, bolts and rail bonds add to the complications of a job which is far from ideal at best.

Thermit welding makes a solid rail where most other processes make a joint. There's no gap, and grinding levels off the surface once and for all. There's no more probability of trouble at a Thermit weld than anywhere else along the rail.

**Thermit welding has been made easier and more simple than the average welded joint process. It costs no more but gives a more perfect result.**

THERMIT

THERMIT

**METAL & THERMIT CORPORATION**

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

# PROGRESS

ABB

EIGHTEEN months ago, American Brown Boveri was only a name embodied in a plan in the minds of a small group of men. That plan contemplated the formation of a comprehensive engineering-manufacturing corporation, designed to offer in its products the highest type of available engineering thought and experience.

The founders of the corporation obtained through contract all American rights to the patents and engineering design and experience of Brown Boveri & Co., Ltd. of Baden, Switzerland, and the great plant of the New York Shipbuilding Corporation at Camden, N. J., was acquired to become the main works of the new corporation.

In addition, long established American electrical manufacturing companies were purchased and included in the corporate structure.

During the past year a comprehensive engineering staff, included in the plan to which the Corporation committed itself at the time of its inception, has been established in Camden. This staff consists of American engineers drawn from the central station, steam railway, electric railway, marine and industrial fields, together with engineers from the staff of Brown Boveri.

New manufacturing equipment and facilities for conducting electrical and mechanical tests have been added at Camden, so that these works will soon be one of the most modern and best equipped in the world for making electrical and mechanical apparatus for use in the fields of power generation and transportation. Production on equipment of this character has begun at Camden.

In addition to this, the plants of each of the associated companies have been enlarged and their plant equipment expanded.

There exists today in America, therefore, a new source of manufacturing and engineering experience designed to assist in the development of the fields of electric power, electrified railways, electrified industry and electrified marine equipment.

The value of this new force in American industry has been recognized and orders received, some of which were for history making equipment. Among the most notable were the orders for the 160,000 Kw. two cylinder turbo-generator for The United Electric Light & Power Company in New York, the two turbo-blowers for blast furnace operation for Bethlehem Steel Corp., which are the largest ever projected in the world, seven of America's largest electric locomotives for main line operation, and the use of the mercury-arc power rectifier for converting power to propel railway main line trains and on city and interburban traction.

The affairs of the Corporation have shown rapid development, and engineers and operators are invited to inform themselves as to the present status and plans for future development.

A 20,000 kw., three-cylinder A-B-B Steam Turbo-generator unit of the type that offers the very desirable combination of high efficiencies and compactness.

# Views of the South Works of the
# the installation of facilities for
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The A-B-B Mercury-Arc Power Rectifier is bringing to power and railway companies many advantages not found in earlier types of converting equipment.

**Main Plant at Camden, N. J. where the manufacture of products undergoing rapid development**

THIS engineering-manufacturing corporation includes among its products several outstanding developments which have gained acceptance during the period just passed.

Mercury-Arc Power Rectifiers for A.C.-D.C. conversion; Turbo-Blowers for steel mill applications; Steam Turbo-Generators for power generation; Automatic Generator Voltage Regulators; Electric Locomotives for heavy traction service have all offered fresh advantages to engineers and operating personnel in utilities, industries and railways and have, in a short time, gained not only acceptance in actual orders but have shown proof of performance in actual installation.

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*Electric Locomotives—for any system of current, high or low tensions*
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*165 Broadway, New York, N. Y.* *Camden, New Jersey*

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—has behind it sufficient operating data to *prove conclusively* its claim as a practical contribution to low-cost, passenger-preferred electric railway service.

Such data, and the experiences of many successful Cincinnati NEW Car operators, are kept in our files—available to any interested electric railway executive on request.

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# GENERAL ELECTRIC

# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

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## Attempt to Return to Home Rule Fails

LEGISLATION inimical to the best interests of the railways of Minnesota, and in the last analysis inimical to the best interests of the citizens there, apparently has failed. By a vote of 41 to 23 a committee has recommended an indefinite postponement of the bill to repeal the Brooks-Coleman law, which placed the regulation of electric railways in the hands of the State Railroad and Warehouse Commission. Senators Henry Morin and Charles Hausler, authors of the repeal bill, contended that the law had failed to work as promised and had been unfair to the people of the city. Senator Sullivan, defending the committee report, said that the 1921 Legislature passed the law because it realized that the railways in the large cities were being made political footballs. The chambers of commerce in the three interested cities opposed the repeal of the act. Quite naturally the railways were concerned. The position they took was made plain in the article in the JOURNAL for March 5, in which comment was made to the effect that the repeal of the state regulatory act was not a prospect which the people of the Twin Cities could contemplate with equanimity. They really stood to lose more than did the railways.

Since the legislation has failed this comment may seem like a case of much ado about nothing, but that is not really so. Administration of regulation in Minnesota appears to have been beyond suspicion. Attempts made there and elsewhere to undo the work of the past in building up regulatory structures that are essentially sound are persistent. Perhaps in some cases fault does lie in commission personnel or some phase of commission administration, but that is no reason for upsetting a plan which, by and large, has proved itself effective and in the best interests of all concerned.

## Where Unification of Transport Facilities Sometimes Strikes a Snag

LITTLE things often influence a man's opinion more than do those of greater importance. This is particularly true of his ideas on public utility management. Months of dependable service are forgotten because of irritation over small shortcomings. Trifles rather than the actual merits of the situation are likely to determine his attitude toward the company. An evidence of such reaction sometimes is found in public opposition to the placing of all local transportation facilities under the control of a single management.

An important aspect that may have a great influence is the dehumanizing process that frequently follows the absorption of a small independent operator by a large transportation corporation. The individuality of employees is lost. Old familiar faces disappear. Mere numbers replace names. The patron becomes simply a passenger instead of being a friend of the company. New rules promulgated by some far-away office govern operation. "Step lively" is the slogan instead of the former "good morning." The rider cares not that the efficiency of transportation has been increased. For him a mechanical process has replaced a friendly journey.

To any one who has carefully studied this matter the advantages of unification seem self-evident and outweigh the minor disadvantages. The quantity and quality of transportation service must be adjusted to the traffic requirements. Only when the street car, the bus and the taxicab are rendering the service for which each is best suited will community transportation be on a sound basis. Obviously, this cannot be done when these various facilities are under separate managements.

If the human element is lost to sight in the change of management, the loss reflects chiefly the desire on the part of the company to supply a quick and efficient service. On every hand transportation companies are trying to establish friendly personal relations with their patrons. It is well that constant vigilance be exercised to this end, so that important unification plans of the future will find public opinion favorable.

## Getting Down to Brass Tacks in Production Practices

NO MOVEMENT in American industry deserves higher commendation or support than the one that seeks simplified practice in production. Born in the hectic days of the World War, it has gained tremendous impetus due to co-operation between the Department of Commerce, producers, distributors and consumers. Elsewhere in this issue of the JOURNAL is a review of a primer just released by the Department of Commerce which not only outlines the results of six years intensive study in eliminating a needless variety of sizes, dimensions and types of commonplace articles, but reveals the enormous savings effected. From milk bottles to structural steel it is one splendid story of what common sense and co-ordinated effort can accomplish. Estimates of savings in money by some of the industries now producing on the simplified practice plan recorded in the primer are: Paving brick, $1,000,000; sheet steel, $2,400,000; steel reinforcing bars, $4,500,000; warehouse forms, $5,000,000; inquiry, purchase, order, and invoice forms, $15,000,000; and lumber, $200,000,000. These figures are proof that much so-called individuality in production in the past was superficial and useless, and further that odd sizes gave the producer no competitive advantage. As the primer points out, "the passing of this misconception has led to a point where today industries as a whole are very generally competing with other industries through simplification to broaden markets and induce the widest possible consumption of their respective products.

Perhaps one of the most gratifying aspects of the

movement is that it has gained world-wide recognition, so that industrial experts, writers and others from foreign countries are urging their industries to follow the example of the American producers. Abroad the approach is for a reduction of variety through standardization rather than simplified practice. "In Anglo-Saxon countries," the primer states, "the relatively greater weight is put on specifications. In continental Europe emphasis is put on dimensional standards. Germany now has more than 1,000 approved standards, while Austria, Switzerland, Holland, Czechoslovakia and Sweden are working along dimensional standardization." All of this is a healthy indication that eventually our friends across the sea will come to simplified practices as the ultimate solution.

When considered from the standpoint of the electric railway field, the movement for simplified practices in production is one that should demand co-operation from every purchasing agent and manufacturer. Already there is sufficient evidence of what economies have resulted from co-operation in determining the essentials and non-competitive items that affect the needs of the industry. Nothing but good has resulted from such co-operation, and as the primer reminds us, elimination of the non-essentials and the false efforts toward individuality "still leaves room for the development of individuality." Every new friend of the movement will be reflected by decreasing production costs, greater efficiency and a broader conception of what is meant by getting down to brass tacks in production practices.

## The Spirit Must Be Backed by Knowledge

MUCH has been said and written about the consequences of the car operator's dealings with the public. Discussion of the importance of courtesy and of the need for transportation salesmanship have occupied a prominent place in the councils of the industry and have been considered among its most important immediate objectives.

It may well be said that the success of public transportation depends on the attitude taken by employees in their contact with their riders. The spirit is the thing. That is the first and indispensable requirement. A disgruntled or a grouchy employee is the very antithesis of a salesman. Loyalty, interest, cheerfulness and courtesy constitute the big four of personality upon which the industry must build. With these factors anything is possible; without them failure is a foregone conclusion.

Consequently the industry has been wisely concentrating on the job of building up and improving the attitude of both management and employees toward the public. But something more is required. There is the need for knowledge and training. It is probably safe to say that every day, on every car, there arise public relations problems that require expertness in their handling. Without proper training the average man finds himself faced many times with situations in which the best of intentions may prove of no avail.

The transportation salesman must be trained for his work. He must know in advance the best method of handling a specific problem which arises in his dealings with the public. The principles and methods to be used are not established. Their determination is a job for experts with a peculiar combination of talents. After that, the problem or case method of instruction probably will be most effective in transmitting this to the men on the job. That is to say, the student will be required to handle in the class room definite situations that are set up to duplicate actual experiences gathered by careful surveys of the problems that arise on a car platform. Training of car men may be expected to become much more thorough than at present. The spirit of employees is important, but the activity of a salesman must be backed by knowledge.

## Wood Preservation Becomes Increasingly Attractive

MANY times this paper has called attention to the desirability, if not the absolute necessity, of preservative treatment for ties and timber used by electric railways. It has been shown that treated wood lasts from twice to several times as long as wood in its natural state. Furthermore, it has been found possible to substitute cheaper grades of wood, particularly those which are not inherently able to withstand rot, for the so-called hard woods which formerly were used almost to the exclusion of others for ties and structural timbers.

In the past, most of the activity in wood preservation has been by the steam railroads. Though the A.E.R.E.A. wood preservation committee has done excellent work in showing the value of treatment, for some reason electric railway men have not taken kindly to the use of preservatives, and at times have attempted to prove that the cost of treatment offsets the gain in life and in ability to use the cheaper grades of wood. It also has been argued that treated wood is hard to handle. If complete refutation of statements of this character were needed, it is found in the article by C. A. Smith published in this issue. The Georgia Railway & Power Company, with which he is connected, was a pioneer in the use of treated timber, having begun it in 1895. Results have been so satisfactory that the company has extended the use of the process very greatly.

Proof of the value of treatment is seen in the cost figures presented by Mr. Smith. Savings as high as $290 per mile of open track have been made. Where the track is beneath paving, much depends on the type of pavement and the length of time it can go without being ripped up. Savings of $528 to $1,188 per track-mile have been obtained with creosoted ties in paving.

Proportionately, for ties the saving runs from 26 to 30 per cent of the cost for non-treated wood. For timber the saving shown is 17 per cent, while for poles it is as high as 52 per cent. This large economy is in part due to the use of a relatively cheap pine instead of chestnut, although the life of the treated pine pole is 22 years, against five years for untreated chestnut.

With such figures before him, it is difficult to see how an engineer can fail to appreciate the money value of preservative treatment. If unsatisfactory results have been obtained in the past it may have been due to wrong methods of treatment, and further investigation should be made to ascertain the reason for poor success. Incidentally, the supply of first grade timber is being exhausted at a rate so rapid that present costs are not likely to obtain for any considerable time. With all grades of timber becoming increasingly expensive, the value of preservative treatment is becoming greater at an accelerated rate.

## "Look Here, upon This Picture, and on This"

PUBLIC debt today is much in the same position of a man taking one step forward and then slipping back two. A few statistics illustrate the point: From Jan. 1, 1920, to Jan. 1, 1926, the national debt was reduced about $4,250,000,000. During the same period state and local government debts increased about $6,750,000,000. Between these same dates expenditures of the national government were reduced about $2,000,000,000 a year, while on the other hand current expenditures by state and local governments increased more than $2,000,000,000 a year, and are still increasing—almost a clear case of inertia as regards removing the burden of taxation. And further, while the national debt is being reduced about $750,000,000 a year, state and local government debts are on the increase at the rate of more than $1,250,000,000 every twelve months.

Taking the same five years as a base it is revealed that state governments contracted new debts about twenty times as fast as they paid off old debts, and that the orgies in state and local government debt were being indulged in at a pace 4¼ times as fast as was the case before the war. And to cap the climax, the amount of state and municipal bonds sold during the past 25 years has risen from $131,549,300 in 1901 to $1,399,637,900 in 1925.

Top this off with the fact that the total public debt of all form of governments in this country is higher now than when our war debt was at its peak in 1919, and it is child's play to envisage the enormous sieve into which is being poured the people's money, to say nothing of that squeezed from public utilities and the manufacturers.

Examine this sieve closer and it is discovered that some of the big holes are formed by 40 per cent of national expenditures, 20 per cent of local expenditures and about 10 per cent of state expenditures being required to pay interest and to amortize existing public debt.

As Hamlet advises: "Look here, upon this picture, and on this," then decide who is the garroter that is strangling the life out of not only those who struggle to furnish adequate local and national transportation, those who manufacture what is vital to transportation, but those from whom public utilities receive their revenues. It is a tremendous problem, which can be solved only by a national movement. Those who sit in the council chambers, and those who dance while they fiddle, must be impressed with the truism that when transportation is strangled the heart of commerce ceases to beat.

## Cincinnati Has a Problem in Co-ordination

OVEREMPHASIS should not be placed on the vote of residents of Mount Lookout, a residential section of Cincinnati, Ohio, to refuse the offer of a four-month trial of motor coach service to replace electric railway service, but the vote is not without its significance, particularly since this is the second time a similar proposal has been rejected. These two instances would seem to bear out the theory of R. N. Graham, also based on experience, that any choice between the two vehicles on the part of the passenger is simply one of greater convenience. But more important than this is the concern that the losses on its buses is causing the Cincinnati Street Railway. Particularly interesting is President Draper's answer to the question, why the motor coach operation of the company loses money when independent companies apparently made a profit.

The remedy suggested does not include discontinuance of any coach lines at this time. The ultimate object is so to fit the coaches into the service that they may be run to the best advantage. This is in line with the ideas of Mr. Draper that there is a place in a unified transportation system for all forms of transportation that can demonstrate their lasting qualities. Mr. Draper says that being charged with the responsibility and obligation of providing unified transportation, the company cannot neglect to adopt any reasonable form of transportation that the public desires and is willing to pay for. It is merely seeking to find out how best to attain its objective. The proposals advanced by Mr. Draper, outlined elsewhere in this issue, are of more than local interest in Cincinnati in that they represent to a considerable extent the objects sought by the industry as a whole in its efforts to co-ordinate service at a reasonable fare in a way least burdensome to the company and to the best advantage of the public.

## Review of the Past Gives Hope for the Future

RETROSPECTION is good in that it makes the individual or the industry pause for a moment to take stock after a review of the past. That is what Lucius S. Storrs, managing director of the American Electric Railway Association, did in his address this week before the Oklahoma Utilities Association. His review of the past ten years of transportation history portrays vividly the worst period the industry ever has seen. Due largely to lack of understanding and failure to appreciate the situation, both by the operators and by their customers, the public, the electric railway industry all but collapsed under the combination of burdens thus heaped on it.

It is greatly to the credit of those men influential in the financial life of the properties that they had the vision to see that local transportation is essential to community growth and the courage to carry on despite every sort of discouragement. As Mr. Storrs pointed out, they are investing their own money and the millions of their stockholders in local transportation enterprises, confident that there is a demand for local common carrier transportation and that, having learned its lesson, adverse conditions similar to those of the past few years will not recur in the future.

While it is agreed that there always will be a demand for community transportation service, and that it can best be supplied with a co-ordinated electric car and bus system, there is still much work to be done. Heed should be taken of Mr. Storrs' statement that the bus problem has not yet been solved. The bus has proved a very efficient tool for certain phases of transportation, but it has been demonstrated also that it cannot effectively do the work that has been performed so well by the street car. The problem is being worked out, but it will require the careful attention of transportation men for some time to come if the most satisfactory solution is to be reached.

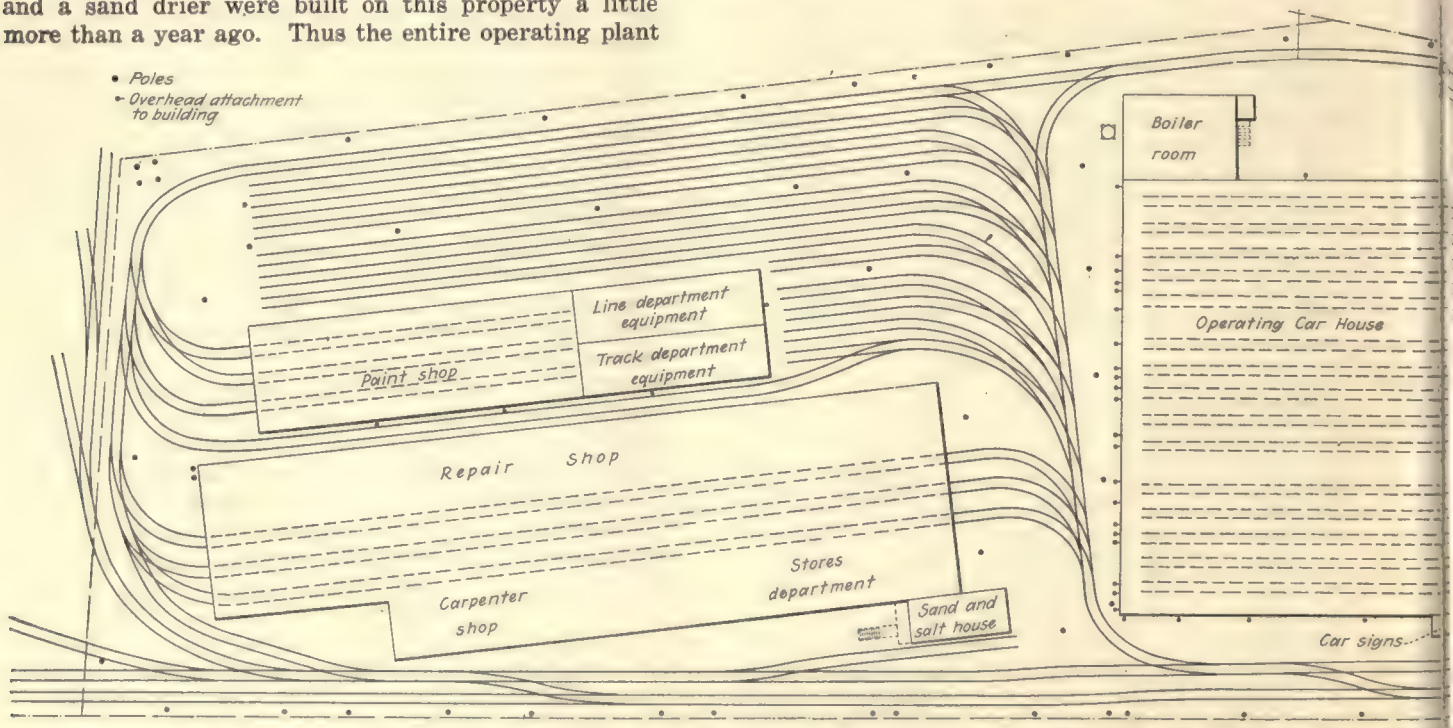
# Extensive Improvements

## Made at Waterbury

**Connecticut Company Has Spent More than $600,000 in Construction of New Administration Building, Operating Carhouse, Sand Drier, Steam Heating Plant and Yard Track Layout**

SINCE the completion last fall of extensive improvements to the property of the Connecticut Company bordering the Naugatuck River at Waterbury, this railway has had one of the most up-to-date car operating and maintenance plants in the country. The principal elements in this development are a new administration building accommodating all the local offices of the division, a new operating and inspection carhouse, and a central steam heating plant. A paint shop and a sand drier were built on this property a little more than a year ago. Thus the entire operating plant is new. Altogether more than $600,000 has been spent by the company in making these improvements.

Prior to this development, facilities at this location, excepting the general repair and overhauling shop, were antiquated and unsatisfactory. The administrative offices were housed in a two-story wooden building erected during the war to accommodate trainmen recruited in other cities who came to Waterbury and found it difficult to secure lodgings. This structure,

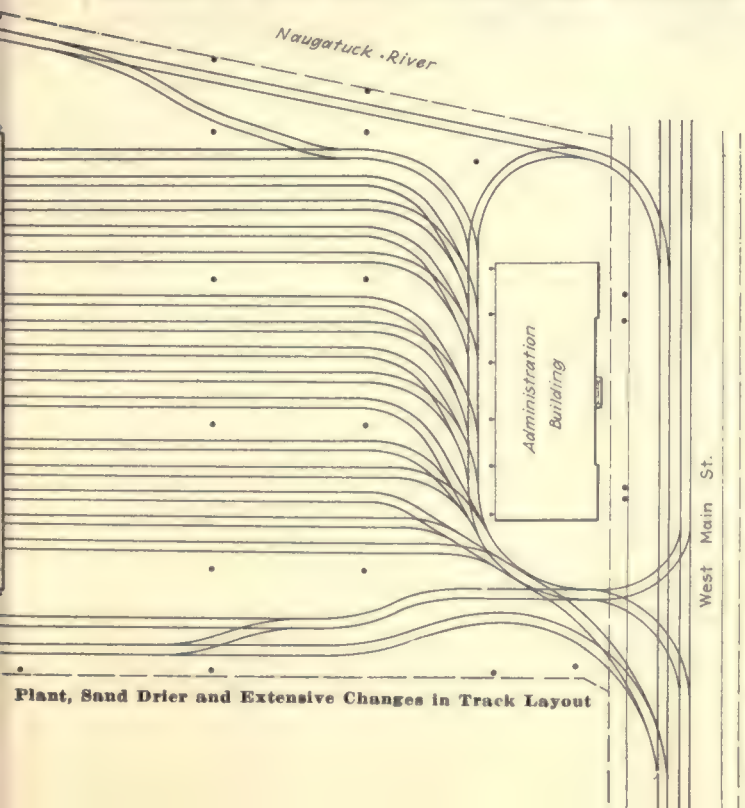



Improvements on Connecticut Company Property in Waterbury Include a New Administration Building, Operating Carhouse, Steam Heat

Three Bays of Five Tracks Each Accommodate a Total of 55 Cars Under Cover in the New Operating Carhouse at Waterbury

however, was ill-suited for use as an office building and was inconveniently located across the river from the operating headquarters. A shed of wood and corrugated iron, known familiarly as the "tin barn," and three other dilapidated structures constituted the only shelter provided for the rolling stock which was not in the overhauling shop. Plans had been under consideration for a long time to improve the car storage, operating and office facilities of this division, but their execution was postponed for various reasons. In 1924 the paint shop and sand drier were built, and last year the improvement was practically completed.

By itself, the Waterbury division of the Connecticut Company constitutes a good-sized local transportation system. Rail lines total approximately 85 miles of single track. In winter 95 passenger cars are operated. In summer this division has assigned to it some 30 additional open cars that are stored elsewhere under cover during the seasons when they are not in use. Bus operations require a total of 22 vehicles. The operating personnel consists of 150 trainmen, 20 bus drivers and eighteen inspectors and starters. The relatively large number of inspectors and starters is accounted for by the heavy rush-hour traffic characteristic of this industrial city. From the foregoing it will be seen that extensive facilities are required for car storage and inspection, as well as for operating and administrative offices.




Plant, Sand Drier and Extensive Changes in Track Layout

Approaching the property from the center of town, one sees first the new administration building, fronting on West Main Street. Constructed of red brick and concrete colored to resemble Georgia marble, this building presents a simple and businesslike appearance. On the second floor are housed the offices of the division manager, the superintendent of transportation, the timekeeper, the dispatcher and the local officials of the claims, track and line departments. On the first floor are the office of the receiver, a trainmen's room, a locker room and a room for inspectors and starters. A school of instruction is located in the basement. This is equipped with the usual control and fare registering apparatus as well as with signal apparatus, because in the Waterbury division there is considerable single-track mileage protected by automatic signals.

Behind the administration building is an open storage yard with fifteen tracks. These tracks terminate in the new operating and inspection carhouse, which has three bays of five tracks each. Its walls are of red brick. The roof is of steel truss construction, supporting slabs of gypsum, making the structure thoroughly fireproof. Numerous glass skylights render the interior bright and cheerful. The general floor level in two sections is about 4 ft. 6 in. below ground, while the rails are supported on reinforced concrete columns spaced 5 ft. apart, as shown in an accompanying illustration. Between the tracks reinforced concrete flooring is provided, but the space between the two rails forming each track has been left open to facilitate inspection of equipment underneath the car. The construction of the building in this way was comparatively simple because it is located on filled land. The other or westerly section is not filled.

At present the capacity of this building is 55 cars, and it is planned to extend it in the direction of the administration building. Ample room exists in front of the present structure where there is now a car storage yard to build an extension equal in size to the part already completed. The overhaul and paint shops have capacity for a considerable number of additional cars, but these facilities are not used for ordinary night storage.

Alongside the operating carhouse a steam heating plant has been built. From this point steam is sent to all buildings on the property. Coal is brought to the

plant by the company's own cars, a track passing close to the boiler house making it possible to dump directly from a car into the bins. Construction of this heating plant was made necessary by the closing down of the Connecticut Company's local power station. Energy for railway operation is secured from the Connecticut Light & Power Company through a substation owned by the latter.

Behind the carhouse are the repair shop and the paint shop, housed in separate buildings. Each of these shops has three tracks, while a service track runs through between the two structures. Beyond the paint shop on the river side is a storage yard with six tracks. As the entire capacity of the paint shop is not required at this time for car painting, a section has been partitioned off for storage of equipment belonging to the line and track departments.

In the Operating Carhouse the General Floor Level Is 4 Ft. 6 In. Below Ground, with the Rails Supported on Reinforced Concrete Columns. The Space Between the Two Rails of Each Track Is Left Open to Facilitate Inspection of Running Gear of Cars

At one corner of the car overhaul shop a sand drying plant has been built. This is of unusual size on account of the hilly territory served by the lines of the Waterbury division and consequently large use of sand. Several unusual features have been embodied in its design. These will be dealt with in another article to appear in a future issue of ELECTRIC RAILWAY JOURNAL.

### BUS GARAGE PROVIDES FOR ORDINARY MAINTENANCE WORK

To accommodate the 22 buses now operated as part of the local transportation system, a section of the trolley express building on this property has been converted into a garage. Facilities for ordinary maintenance work have been provided. Heavy overhauling of buses, however, is done at the company's New Haven garage. The remainder of this building is still used for trolley express purposes.

Particular attention has been paid in the execution of this improvement program to the general appearance of the property. At each end of the administration building a small lawn has been laid out. Evergreen shrubs and flowers have been planted in various locations throughout the area. The buildings themselves are necessarily of simple and substantial design, but their neat and businesslike appearance gives a pleasing aspect to the property.

## Farm Demonstrations via Interurban

PHENOMENAL interest is attending the demonstration of electric farm equipment on board the farm electric railway car fitted out by Purdue University agricultural extension department in co-operation with the Indiana electric companies and interurban lines. The car is now making a tour over all the electric lines of Indiana. Farmers along the line interested in studying the costs and production possibilities of electricity on the farm will have an opportunity to inspect the car en route.

Truman E. Hienton of the agricultural engineering staff, who is in charge of the car, broadcast on the radio recently, telling of the purposes of the tour. The car is equipped with a model farm kitchen. Electrical appliances on board include milking machines, cream separators, poultry house lighting systems designed to increase egg production, ensilage cutter, feed grinder, incubator, fanning mill, water supply system, cider press, wood saw, churn and grindstone.

Officials of the university predict that many thousands of farmers will have seen the car before the tour is ended. Interest during the first few days of the tour was acute and those in charge were kept busy with explanations of costs and like information.

# Transportation Winning Hardest Business Battle in History

*By Lucius S. Storrs*
Managing Director American Electric Railway Association, New York City

*Lucius S. Storrs*

**IN AN ADDRESS before the Oklahoma Utilities Association at Oklahoma City on March 9 Mr. Storrs presented an unusually strong plea for co-operation on the part of all utilities and portrayed in vivid manner the momentous economic struggle from which the industry is emerging head up and shoulders back. Every transportation executive will get new inspiration from this abstract of Mr. Storrs' thinking.**

PROGRESS and prosperity of all utilities are closely identified with the growth of the communities. Just as cities go forward so do the utilities serving them grow and prosper. It behooves us for selfish reasons, if for no other, to do everything within our power to encourage and help them. Thus it becomes apparent that there is need for all of us to work together, shoulder to shoulder. We should extend our services jointly, have a common interest in seeing that all of us render the best possible service and obtain a square deal from public officials and the public generally.

I know that all of you will be pleased to hear that the industry is on a better basis than it has been at any time in many years and that there is no great problem before us today which does not seem possible of solution, provided we have the united support of all the branches of the utility business.

Not a little of this advance has been due to co-operation. Local transportation men are joining hands with other utility men in carrying out the plans of state committees on public utility information, state associations, sectional associations and, finally, national associations.

Initially, I want to impress upon you that the local transportation industry is not decadent. If you have been led to believe that its funeral is imminent, put that thought out of your mind now. It is not true.

In urban centers, particularly, there never has been greater need for high-class local transportation both by electric cars and buses than there is today. It has been proved conclusively that the bus is not going to replace the electric car in mass transportation, that private automobiles cannot furnish all of the required service and that co-ordinated electric railway and bus service under single managements is the logical solution of the local transportation problem. Electric railway men are going forward throughout the country to supply this great public requirement.

The industry is emerging from its ten or more years of reverses more physically fit, with a broader vision and with an increased appreciation of its opportunities, just as the United States emerged from the great World War a stronger nation. Today, instead of being a decrepit plant waiting for the undertakers to carry it away to the boneyard, the electric railway industry is charged with new energy and is more capable of rendering good service and more determined to render it well than it has been at any time in the last fifteen years. Out of ten years of discouragements, marked by rising costs, bus competition and many other reverses, the industry is emerging head up and shoulders back, working with keen mind and willing hands and going forward to a constructive and profitable future.

You have heard much of abandonments of electric railway mileage, so I want to set you right on that situation. Despite private automobile and bus competition, the total electric railway mileage in the United States today is only 4 per cent less that it was at the peak record for all time in 1917. And virtually all of these abandonments have been in towns of from 8,000 to 25,000 persons, or in rural sections where not one foot of the track ever should have been laid. The pioneer builders made two serious mistakes that have exerted a great influence on the industry during the recent years. First, they built many lines without regard to the traffic demands, and, second, they tried to operate them on a fixed 5-cent fare in cities and a much lower fare than steam lines in rural sections. Not one property in a city of 50,000 or over ever has been permanently abandoned. Those are the facts about electric railway abandonments in this country, and they supply a most eloquent answer to the assertion that the electric railway is doomed.

The cost of producing rides varies in different communities and, naturally, the sales price of them also will differ. The public generally, in most cities except New York, now has come to realize this, and practically all communities are willing that fares shall be adjusted with changing costs.

The advent of the European war, with skyrocketing wage and material costs, brought about revolutionary changes. Almost over night the cost of wages and material doubled, but fares were not changed. Service had to be continued, so it was necessary to meet these rising costs and hope that fares would be raised pro-

portionately. Unfortunately, the industry had put in some 30 years educating the public to a fixed 5-cent fare, so it was impossible to change fares rapidly enough to meet rising costs.

For several years fare raises came about very slowly. Coincident with rising costs and almost stationary fares had come jitneys, private automobiles and bus competition. As a result, when President Wilson in 1918 appointed the Federal Electric Railways Commission, composed of representatives of the public, labor, financial houses and electric railways, to investigate the conditions of electric railways throughout the country, about one-sixth of the total mileage of the industry either was bankrupt or in receivers' hands.

The stock-taking by the industry before the commission in 1919 certainly showed a deplorable condition. The fact that the industry has come back to render the excellent service that it does today proves conclusively the essentiality of it and also the measure of the men engaged in it. If the industry had not been an essential one, or if it had been manned by weaklings, it would have passed out under the conditions existing shortly after the close of the European war.

The inquiry resulted, however, in a remarkably constructive report on existing conditions and a series of suggested remedies of a high order. The outstanding declaration was that public transportation by rail cars not only was a necessity but would be for many years to come and that good service could be obtained only by closer co-operation between the public, managements and men. The fixed fare system and independent jitney and bus competition were scored heavily as economically unsound and the need for better public relations, obtainable through frank dealings, stressed.

Mere acceptance of the federal report did not restore the industry to its present improved state. Local transportation men turned back toward home from those Washington hearings to face one of the hardest business battles in history. Included in the program they sought to carry out were creating better public feeling, obtaining equitable fares, eliminating unfair competition, improving service, co-ordinating the rail car and the bus and obtaining a readjustment of their taxes.

### Public Friendship Being Won

The problem of enlisting public support was the initial one approached. Managements which carried their story to the public honestly and showed themselves willing to be friendly soon found a friendly response. The printed word was used widely, executives and employees made speaking campaigns and gradually public understanding began to be created. After a foundation had been laid through an explanation of conditions, the advertising campaigns quickly shifted to salesmanship, and today rides are being merchandised as intensively and as intelligently as are many commodities.

The bus problem is a grave one and it is not entirely solved to date. Although it has been demonstrated that the bus will not supplant the electric car, it also has been proved that the bus has a place in local transportation. It has, for instance, proved a very efficient tool in replacing some small electric railway lines which never should have been built. There is a place for it in new territories until their traffic is so dense that they demand rail lines. Likewise, it is a splendid tool to use in co-ordination with rail lines in cities. Progressive executives are using the bus where it can best serve.

That a bus ride cannot be supplied as cheaply as a street car ride and that buses occupy more street space per passenger than electric cars has been proved conclusively, and these two factors enter very largely into every proposal to supply bus service. Furthermore, although to date the bus has been able to escape regulation and taxation to a far greater degree than the rail car, this, of course, cannot continue indefinitely. It must compete with the rail car on a similar footing, and as the control of service and taxes becomes equalized, the economy of the rail car steadily becomes more apparent and its continued place more assured.

I beg you, however, not to labor under the delusion that electric railway men generally have tried or are trying to save their properties and restore their service to public favor merely by fighting the bus; far from it. They realize that the only way to obtain and retain public favor is to give good service. There is a great demand not only for buses but also for electric car service more nearly approximating automotive rides. To meet this demand the electric railway industry is modernizing its equipment rapidly and, happily, this modernized service—embracing principally lighter, faster and more comfortable cars and smoother roadbed—is increasing business.

### Advisory Council Backing Modernization Movement

Standing squarely behind this great modernization movement is the Advisory Council of the American Electric Railway Association, formed in 1925. Under the leadership of B. C. Cobb of Hodenpyl, Hardy & Company, this council during the last two years has sought with all its power to convince companies that they must equip their properties with the most comfortable conveyances, both in rail cars and buses, and aggressively seek business. When I tell you that its members are convinced of the future of the local transportation business and are giving much of their valuable time and effort toward advancing its interests, you will realize fully the truth of the statement that it is not a "dead or dying industry." A very large majority of them, too, are investing their own money and the millions of their stockholders in local transportation properties, confident that there is a demand for local common carrier transportation and that soon all of the clouds of uncertainty will be rolled away and it will come into its own again.

As a result of the co-ordination movement more than 7,000 buses are now being operated by approximately 275 electric railway companies over more than 15,000 miles of route. Buses generally are being used in extending transportation routes and little service parallels the main rail lines. Destructive competition is growing less because buses cannot operate profitably at electric railway fares and also because it is no longer possible to purchase efficient buses except upon reasonable financial terms.

That there will always be a demand for common-carrier local transportation admits of no argument. That it can best be supplied with a co-ordinated electric car and bus system has been amply demonstrated. That eventually this service must be paid for in such measure as will give an adequate and fair return to managements and investors cannot be disputed. Accepting these three statements, the future of live progressive local transportation companies seems to be plainly charted. They cannot help but go ahead. It is inevitable. Even though they held back, which they did not, public demand for service would drive them into profitable progress.

# Automatic Washing for Pittsburgh Cars

**Electrically Controlled Equipment Providing for Rapid Washing Is Being Installed in the Various Carhouses of the Pittsburgh Railways—Details of the First Installation Are Given**

REPEATED efforts have been made by various electric railways to design car-washing equipment which will combine the operations of brushing and washing as the car moves forward and do this mechanically rather than by hand labor. The Pittsburgh Railways has been working out such a process for some time and a preliminary description was published in the Aug. 14, 1926, issue of ELECTRIC RAILWAY JOURNAL. This device has now been perfected to a point where a complete shower bath equipment has been installed at the Craft Avenue carhouse of the company and it is planned to provide twenty additional showers at other carhouses. The equipment has been perfected and manufactured under the direction of John D. Barr, assistant engineer of the Pittsburgh Railways.

Car Entering the Preliminary Wetting Spray by Passing Between Two 1¾-In. Upright Pipes Perforated with 3/32-In. Holes Spaced 1½ In. Apart. By Staggering the Holes the Water Is Sprayed on the Car in Two Directions

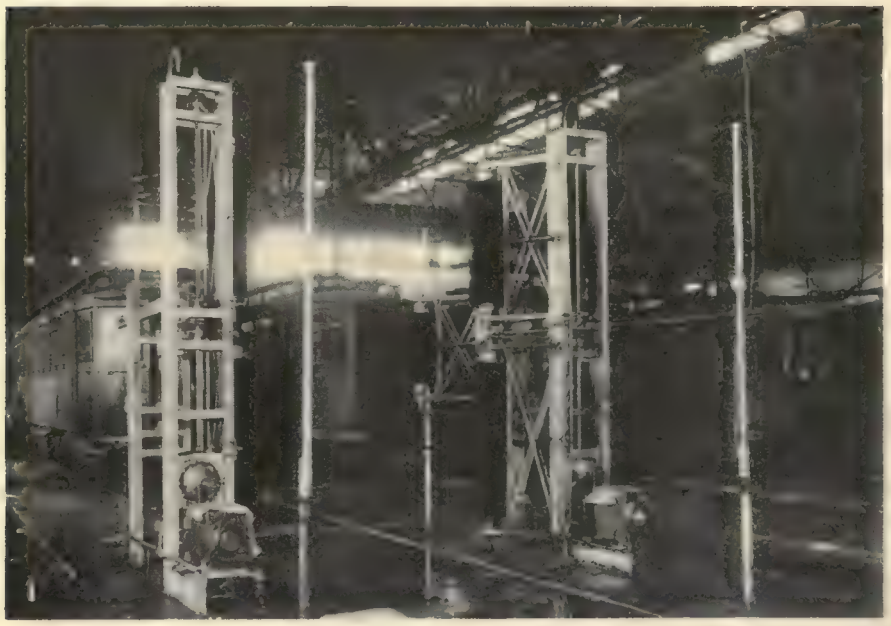
By use of the new equipment a car can be washed, brushed and rinsed in about five minutes, with only two men employed in the process. Compared with previous methods of cleaning used by the railway this is a great reduction, since previously about one hour's time for one man was needed to wash a car. A great advantage also lies in the increased number of cars that can be cleaned quickly between rush-hour periods. The reduction in time enables the entire equipment to be washed more frequently than by old methods, so that cars can be kept on the street in much better appearance, which is one of the essential details for keeping the public pleased.

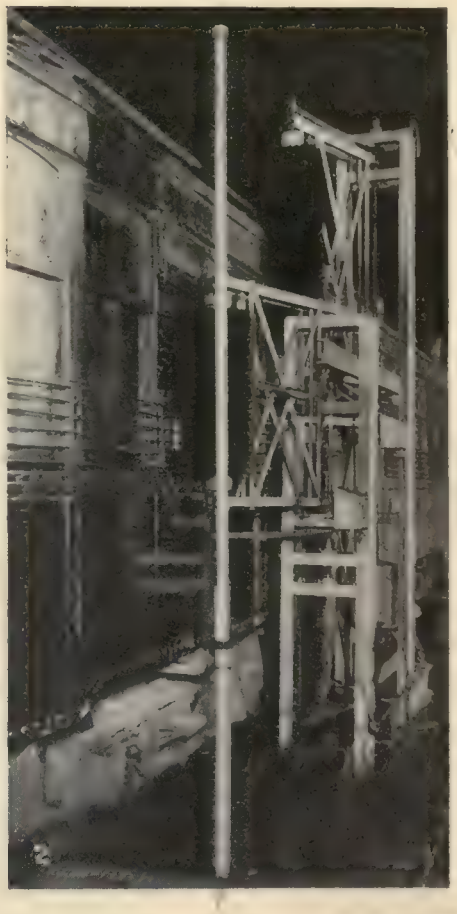
With the new apparatus the car is passed first between two spray arms which throw the water with sufficient force onto the sides, ends and top deck to moisten thoroughly any dirt and wash off a considerable portion of it. The 1¾-in. diameter upright pipes have 3/32-in. holes spaced 1½ in. apart. The operation of the spray is controlled automatically by circuit breakers which start the flow of water as the front end of the car enters the spray equipment. The water is cut off automatically as the car passes out.

Following the initial wetting one man at each end of the car goes over the ends with a round bristle brush. The brush is 5¾ in. diameter and has a handle 4 ft. long. This scrubbing has been found better than mechanically operated brushes for the ends, as these at present have not been perfected so as to be entirely practicable. With a good type of brush this task can be performed easily without the use of any water additional to that which remains on the car after the initial sprinkling. If necessary a barrel of water can be placed in a convenient position alongside the car washing track for dipping the brush.

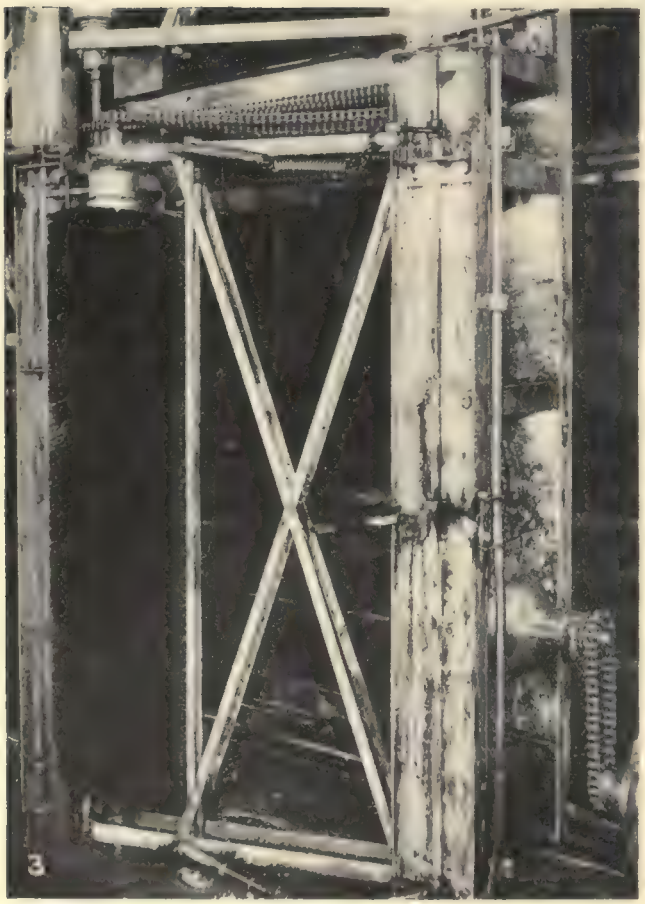
Following the brushing of the ends the car is advanced to the automatic brushing machine, which is equipped with additional spray apparatus. Circuit breakers start both the revolution of the brushes and the action of the spray as the car approaches the machine, and similar equipment shuts off both as soon as the car has passed through. The brushes used were developed by the Wolfe Brush Company, Pittsburgh, Pa., and are made on wooden cores with an over-all brush diameter of 13 in. The assembly of the brushes and also the number of brushes required depend on the profile of the cars that are to be washed. A total brushing length of about 14 ft. is required in Pittsburgh. A single brush of this length has not been found practicable on account of its weight and because one brush will not follow the profile of the car and properly brush all sections.

In the Pittsburgh installation three brushes on each side have been found satisfactory. The length of these varies somewhat according to the type of cars to be washed. The lower brush is a little longer than the flat





# Scrubbing and Washing of Cars Are Made Automatic with This Equipment

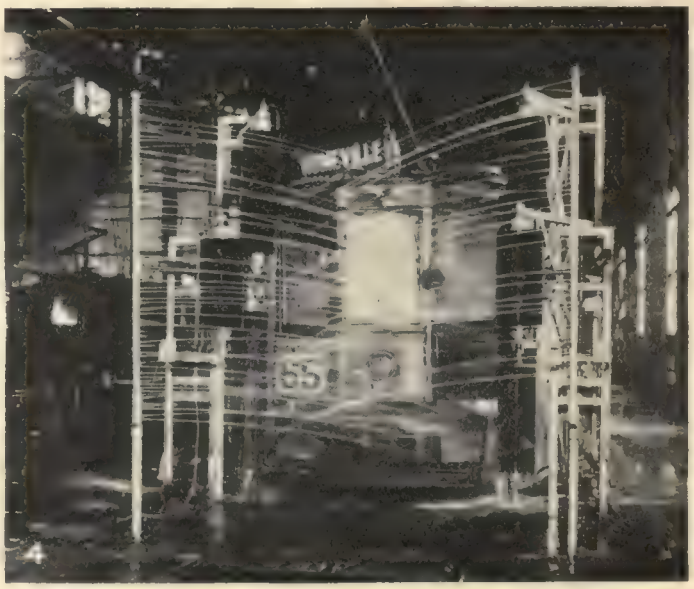


No. 1. View of brushing equipment with two spray arms in the foreground.

No. 2. Brushing the sides as the car passes through.

No. 3. Close-up of brush drive to show equipment.

No. 4. Car entering between the brushes with spray in operation.



surface of the car side panel below the windows. The center brush is long enough to brush the window surfaces. The top brush projects farther from the body of the machine than the center one and must not be so long that its action will be hampered by contact with parts of the car which project as far out as the window guards. In Pittsburgh it has been found that to accommodate the various classes of equipment the most convenient axial lengths for the brushes are 60 in. for the bottom, 48 in. for the top and 33 in. for the center brush.

The brushes are placed so as to overlap each other and the whole equipment is designed so that as the car

Method of Using Strip Brush to Clean Window Glass Behind Guard Rails When Rotating Brushes Do Not Remove Mud

passes between the two sets each brush will be forced against its sides with just enough pressure to give the right brushing effect on the particular part of the surface it is intended to cover. The pressure of the car against the brushes operates the switch of the motor which revolves them. Brush rotation is contrary to the movement of the car and is adjusted at a speed necessary properly to scrub the surface. When pressure is released the brushes cease turning. As the car approaches the brushes it is sprayed first with water and then rinsed in a similar way after the brushes have done the scrubbing.

The framework of the machine is made of ¼-in. x 8-in. channels and the arms are of light 4-in. channels, braced to make them rigid. A common type of sprocket chain is used throughout the machine for driving. A 5-hp. motor drives the equipment through a bevel gear. Ball bearings are used throughout the machine.

After the scrubbing and rinsing the car is placed for drying. It has been found that the appearance of the car is better than would have resulted had hand operation been used. There is no streaking or smearing with the mechanical method. When washing cars by hand it has been found that the appearance is usually fairly good as long as the water is on the surface, but that hand methods do not give sufficient scrubbing or washing and the result is that streaks and smears are observed as soon as the surface dries.

The hydraulic window washer which is used for washing the window glass back of the guard rails was described in the ELECTRIC RAILWAY JOURNAL, Aug. 14, 1926. This is used only in case the glass has been smeared with mud which cannot be removed thoroughly by the brushes. The hydraulic window washer consists of a thin metal holder 20 in. long which carries a supply of water from a small flexible hose so that it is distributed through the openings with a spraying effect. The strip is equipped with a brush just heavy enough to clean the surface of the glass and thin enough to allow its insertion behind the guard rails. When necessary this operation is performed just after the ends of the car have been washed and before it passes the large brushes. The rinsing of the car will then complete the window washing so that the glass will be perfectly clean. Extra hand cleaning of the window glass has been found desirable in some cases, although it can be dispensed with.

## Davenport Tells the World

RADIO broadcasting has a value of unknown extent in reaching new fields. This was brought out when a lay listener hundreds of miles east of Davenport mentioned to the local railway executive that he had heard an interesting talk on electric railway transportation. The clue was followed up, with the result that ELECTRIC RAILWAY JOURNAL is enabled to present the high spots of an address made from radio station WOC by R. J. Smith, vice-president and general manager Clinton, Davenport & Muscatine Railway.

This particular evening had been set aside for a discussion of local industrial and transport problems. Talks were made by representatives of the Rock Island, Milwaukee and Burlington systems on steam railroad subjects, while Mr. Smith talked humorously about the little electric brother who had interchange connections and through rates with them all. He emphasized, in particular, that the electric line by its tie-up with the Chicago & Northwestern helped the other three great trunk carriers in serving the Tri-Cities.

After explaining the nature of the connections and the character of products handled, Mr. Smith presented some data in such a popular way that others may be interested in the text for the sake of doing likewise. Thus:

In the past twelve months this 70 miles of electric road carried 263,000 passengers and 188,000 tons of freight. In order to do this, the Clinton, Davenport & Muscatine Railway ran just under 1,000,000 car-miles. How does that stack up with the past year's mileage of your Rolls-Royce? We moved 5,664 freight cars; and paid out more than $19,000 in taxes and more than $141,000 in wages. Two million kilowatt-hours of electricity were consumed in this work, or enough to run your washing machine, on the ordinary basis of four shirts a week and other apparel in proportion, about 100,000 years. Our statistician has calcu-

lated that this consumption of electricity would heat my Saturday night bath for 7,915 years.

This railway has been a part of this community since 1903, and although those 23 years have brought about many changes in the way of doing things, and particularly in transportation through the widespread use of the automobile, nevertheless a great need continues to grow for the movement cheaply of passengers and goods 24 hours a day and 365 days a year, regardless of weather conditions.

So great is this modern need of transportation of all sorts that each sort is sometimes wrongly chosen. The palatial flier of the trunk line railroad, or that same railroad's enormous coal "drag" of 70 cars; the airplane's flight; the interurban and street car; the automobile's flexibility; the ocean, lake or river craft; even the horse and our own feet—yes, our own patient "dogs" that in this modern age have almost forgotten how to walk—all have their proper place in the transport system.

That place must be determined by each individual for his own special need. And in determining it, cost and reliability must always be considered. For low cost and dependability the railroads are, more than ever before, this country's bulwark of transportation. The Clinton, Davenport & Muscatine Railway is proud, indeed, to furnish its small part in this great transportation scheme and to contribute to the further upbuilding of these thriving communities.

# Modernization Continues in Memphis

**Initial Investment of $475,000 for 32 New De Luxe Cars Followed by an Additional Expenditure of $130,000 for Reconstruction—65 Cars Remodeled for One-Man Operation**

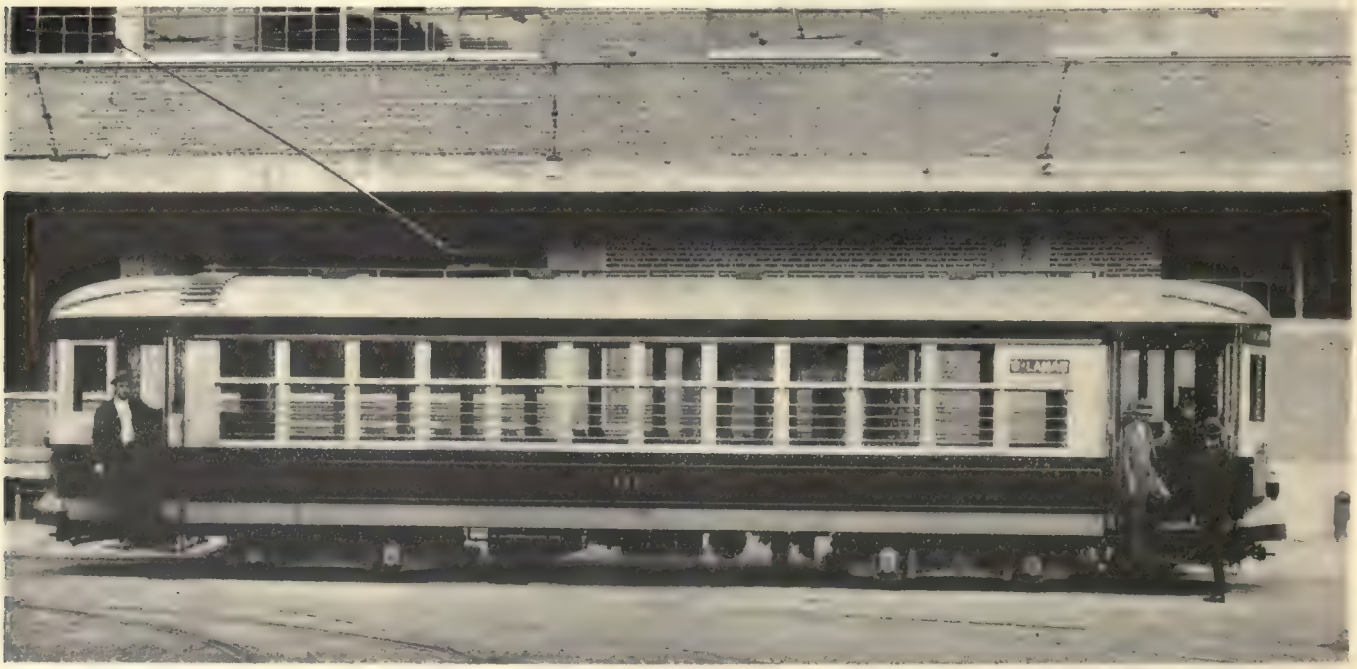
STIMULATION of riding and bettering its public relationship led the Memphis Street Railway, Memphis, Tenn., to decide on a program of modernization. The initial step in this program consisted in the purchase of 32 low-level, double-truck, semi-noiseless de luxe cars from the St. Louis Car Company, St. Louis, Mo., at a total cost of $475,000. Details of these new cars, together with the public reaction to their introduction, were given in the Sept. 4, 1926, issue of ELECTRIC RAILWAY JOURNAL.

As they met with such hearty public approval it was decided to go a step further and rebuild 40 of the low-level cars purchased in 1923 to make them suitable for single-end one-man operation. Work was started last October and completed on Jan. 1, at a cost of approximately $80,000. The front platform was redesigned to provide sufficient space for the installation of an entrance and exit door with folding steps. The rear platform was rebuilt with only an exit door. The front and rear exit doors are treadle-operated. All platform apparatus was relocated to permit of unobstructed passenger entrance and exit and convenience of operation. They are now practically duplicates of the 1926 cars with the exception of seats and floor covering. These rebuilt cars were so well received by the public that it encouraged the company to rebuild along the same lines 25 cars purchased in 1914. They were completed about March 1 at a cost of approximately $50,000.

Of the 187 cars owned by the company 97, or about 50 per cent, are designed for single-end, one-man operation.

These cars with their bright color combinations present a very favorable appearance.

Comfortable Seat for Motorman and the Convenient Location of Controlling Apparatus Are Features in the Reconstructed Cars of the Memphis Street Railway



One of the 40 Cars of 1923 Type Reconstructed by the Memphis Street Railway. Arch Roof, Excellent Color Combination, Front and Rear Treadle-Operated Doors Present a Fine Appearance and Provide Safety Features

# Substantial Economies Obtained by Use of Treated Timber

**Georgia Railway & Power Company Has Reduced Cost of Ties by $1,188 Per Year Per Mile of Track—Prior to Installation All Timber Now Receives Preservative Treatment by the Rueping Process**

*By C. A. Smith*

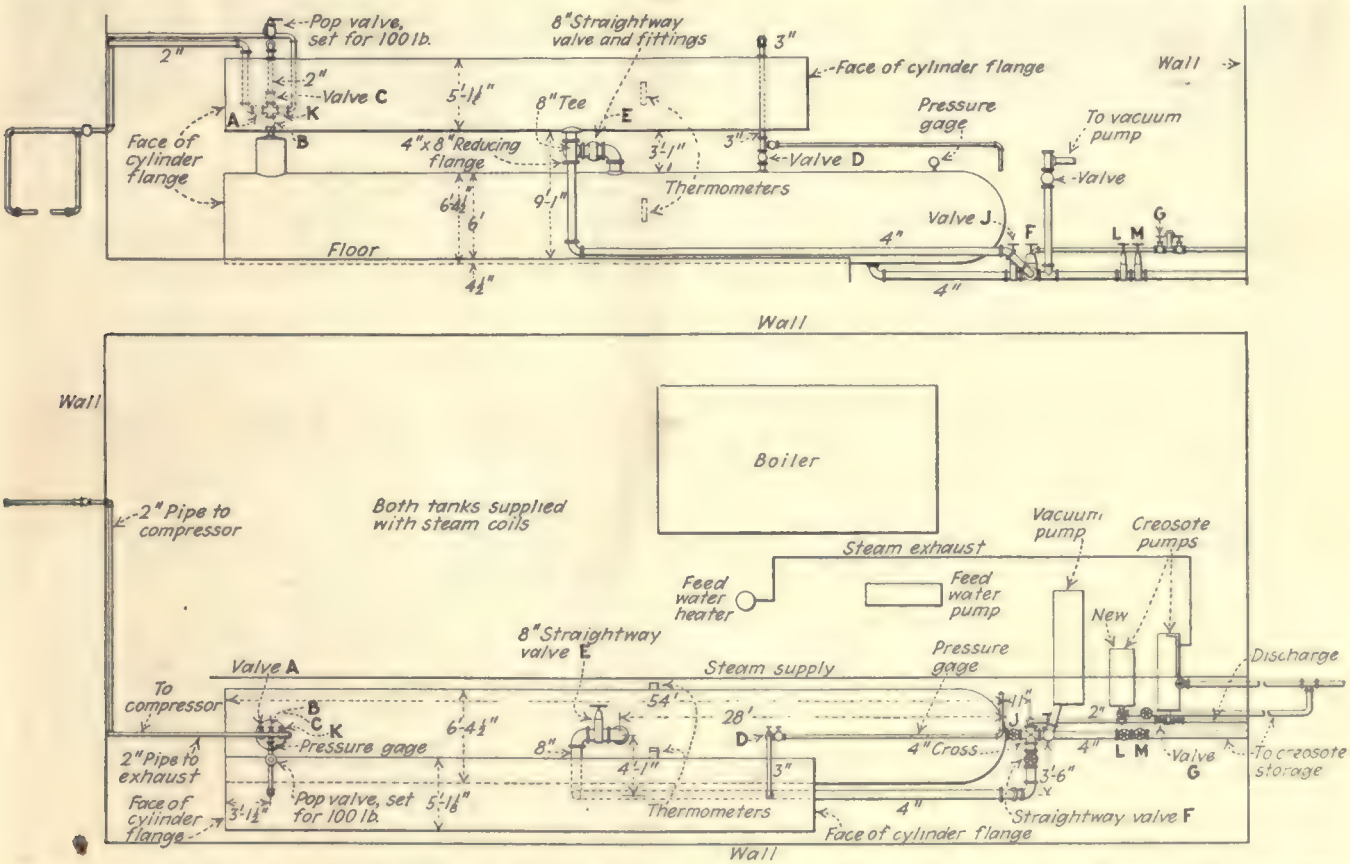
Superintendent of Roadway Georgia Railway & Power Company, Atlanta, Ga.

MORE than 30 years of experience with preservative treatment of timber by the Georgia Railway & Power Company, Atlanta, Ga., has proved that substantial economies are produced by the practice. This company was one of the pioneers in wood preservation, having begun the use of creosoted timber as far back as 1895. Recently some ties laid in that year were taken up, and a large proportion of them were found to be in good condition. In comparing the costs of treated and untreated ties, however, twenty years is taken as the useful life of a treated tie. At the end of that time it usually is necessary to remove the tie for reasons other than deterioration. Wearing out of the rail or pavement may make it necessary to rebuild the whole track structure, and old ties are removed even when sound. Experience with treated ties shows savings ranging up as high as $1,188 per year per mile of track, as compared with untreated ties.

The original creosoting plant of the Georgia Railway & Power Company had one pressure cylinder 5 ft. in diameter by 40 ft. long with the necessary storage tanks, pumps, etc. It was located close by the power house boiler room from which it took steam, and was constructed in the open with simply a shed for shelter. The full cell pressure process was used, as creosote at that time was very cheap, costing around 6 cents per gallon. Timber was impregnated by this process with a retention of from 10 to 14 lb. per cubic foot of timber.

Good results were obtained by this old plant. In 1926 we removed ties from a stretch of track which was built in 1895 using creosoted pine. These ties had been in service for 31 years and a large proportion of them were in sound condition. The small amount of deterioration is seen in the accompanying illustrations showing these ties after removal.

In 1909 we rebuilt our creosote works and installed a

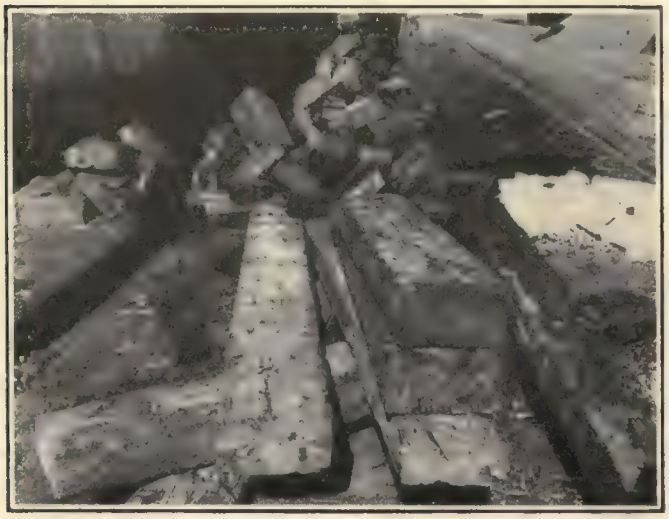


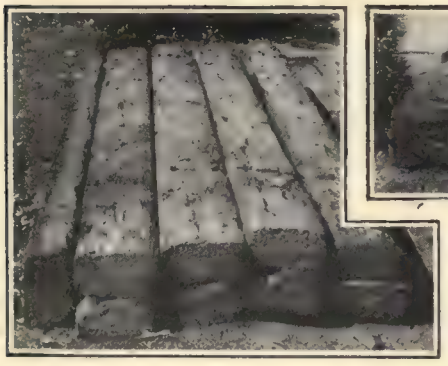

**Creosoting Plant of the Georgia Railway & Power Company, Where All Tie and Structural Timber Is Treated by the Empty Cell Process**

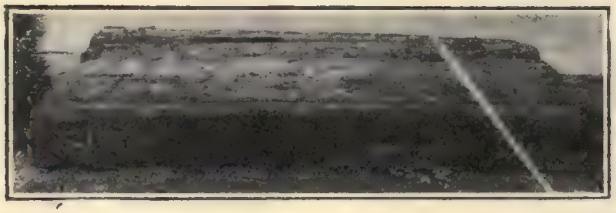
new pressure cylinder 6 ft. in diameter by 50 ft. in length capable of handling 300 ties per charge. The cylinder, pumps, boiler, etc., were housed in a brick building. The storage tanks were located in a pit back of the building at such a level that creosote could be emptied from railroad tank cars by gravity into the storage tanks.

This plant was operated under the full cell pressure process until 1917. By that time the price of creosote had advanced from 6 cents per gallon to 15 or 20 cents per gallon. For that reason we rearranged our plant, adding a storage cylinder above the pressure cylinder and installing an air compressor with necessary piping so as to use the Rueping or empty cell process with initial air. By the use of this process, penetration is obtained equal to that obtained by the full cell process with a retention of about 6 lb. of oil per cubic foot of timber, instead of from 10 to 14 as with the full cell process. The layout of this plant and its general appearance are shown in accompanying illustrations.

Practically all of our tie and structural timber is treated. We use sap pine timber in all work which does not require a high fiber stress, because this timber can be bought at a very moderate price. In our track construction we use the same class of timber with a steel tie plate beneath the rail on each tie. A creosoted







**Creosoted Ties Installed in 1895 on the Property of the Georgia Railway & Power Company Were Removed in 1926. A Large Majority Were Found to Be in Good Condition After 31 Years Service**

COST PER YEAR OF A TIE BENEATH PAVEMENT

| | Cost of Pavement $1 per Sq.Yd. | | Cost of Pavement $3.50 per Sq.Yd. | |
|---|---|---|---|---|
| | Plain Tie | Creosoted Tie | Plain Tie | Creosoted Tie |
| Life, years | 10 | 20 | 10 | 20 |
| Cost of tie | $0.96 | $1.15 | $0.96 | $1.15 |
| Surfacing | 1.50 | 1.50 | 1.50 | 1.50 |
| Paving | 2.00 | 2.00 | 7.00 | 7.00 |
| Total | $4.46 | $4.65 | $9.46 | $9.65 |
| Interest, 7 per cent | $0.31 | $0.33 | $0.66 | $0.68 |
| Depreciation | 0.45 | 0.23 | 0.95 | 0.48 |
| Cost per year | $0.76 | $0.56 | $1.61 | $1.16 |
| Saving per tie per year | .... | $0.20 | .... | $0.45 |
| Saving per mile per year | .... | $528.00 | .... | $1,188.00 |

COST PER YEAR OF 1,000 BOARD-FEET OF BRIDGE TIMBER

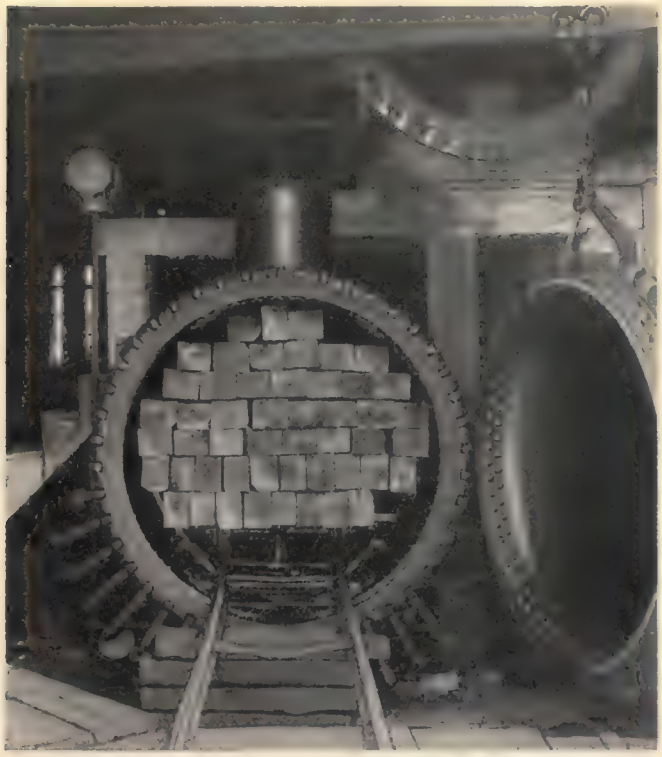
| | Plain | Creosoted |
|---|---|---|
| Life, years | 12 | 25 |
| Cost, erected | $65.00 | $75.00 |
| Interest, 7 per cent | $4.55 | $5.25 |
| Depreciation | 5.42 | 3.00 |
| Cost per year | $9.97 | $8.25 |
| Saving per year per 1,000 b. ft. | .... | $1.72 |

COST PER YEAR OF A TIE IN OPEN TRACK

| | Plain Tie | Creosoted Tie |
|---|---|---|
| Life, years | 7 | 15 |
| Cost of tie | $1.02 | $1.15 |
| Cost of installation | 0.75 | 0.75 |
| Total | $1.77 | $1.90 |
| Interest, 7 per cent | $0.12 | $0.13 |
| Depreciation | 0.25 | 0.13 |
| Cost per year | $0.37 | $0.26 |
| Saving per tie per year | .... | $0.11 |
| Saving per mile per year | .... | $290.40 |

COST PER YEAR OF 30-FT. POLES, CLASS A

| | Chestnut Plain | Pine Creosoted |
|---|---|---|
| Life, years | 5 | 22 |
| Cost of pole | $9.00 | $11.35 |
| Cost of setting | 10.00 | 10.00 |
| Cost per year | $19.00 | $21.35 |
| Interest, 7 per cent | $1.33 | $1.49 |
| Depreciation | 3.80 | 0.97 |
| Cost per year | $5.13 | $2.46 |
| Saving per pole per year | .... | $2.67 |
| Saving per mile per year (105.6 poles) | .... | $281.95 |



A Load of Ties Has Just Been Run Into the Treating Tank at the Atlanta Creosoting Plant

sap pine tie protected against wear by a steel tie plate will last as long as the rail under light traffic and frequently as long as two sets of rails under heavy traffic.

Cost figures for treated and untreated ties and poles are given in accompanying tables. In track with pavement costing $1 per square yard the annual saving has been found to be $528 per mile; with pavement costing $3.50 per square yard the saving is $1,188 per mile. In open track the saving is $290 per mile per year.

Ties for Treatment Are Stacked on a Carriage so that They Nearly Fill the Interior

Similar savings have been made by preservative treatment of structural timber and wood poles. Savings per year per 1,000 ft. b.m. are estimated at $1.72 Savings per mile of double-pole line are estimated at $281.95.

We must consider not only the actual economies in the use of treated timber at the present time, but we should endeavor also to anticipate conditions as they will be some years hence. The annual cutting of timber in this country far exceeds the annual growth. It requires from 35 to 100 years for a second growth tree to reach the size of pole timber, and this pole will last only from five to fifteen years untreated in the ground. It is estimated that with the present rate of cutting, the supply of commercial timber will be exhausted in 35 years. Under these circumstances every effort should be made to conserve the existing supply.

# Louisville Editor Lauds Electric Dining Car Menu

**Meal Set Before Minnie Maddern Fiske by Interstate Public Service Company Considered Good Substitute for What Once Made Kentucky Famous**

DINING car service as supplied by the Interstate Public Service Company, Indianapolis, Ind., has recently aroused the enthusiasm of a Blue Grass editor, as evinced by the following editorial which appeared in the Louisville *Herald-Post* recently:

KENTUCKY'S NEW FAME

There is more than one road to fame. Kentucky used to rely on its production of fine whiskies, fast horses and fair women to lend distinction in foreign parts, but since one of this trilogy has been forcibly suppressed, the state has been considerably puzzled to supply a substitute. An idea of filling this hiatus is supplied by the *Interstate News*, which isn't a newspaper, but a house organ of the Interstate Public Service Company. It informs us that Mrs. Fiske and her company, who recently played an engagement of Ibsen's "Ghosts" at the Brown Theater, left Louisville for Indianapolis via electric car, and in a dining car operated by that company were served the following meal: Dix River tomato soup; Black Mountain turkey; Cranberry sauce à la Middleboro; Cynthiana dressing; Winchester spuds; asparagus Madisonville; hearts of lettuce, Richmond dressing; Harris pumpkin pie or Paducah plum pudding; Louisville roquefort cheese; wafers; coffee; mints.

The significance of this menu is more apparent when it is observed that every mouthful of food was consumed while the players were rolling through our sister state of Indiana. It is tantamount to the suggestion that if you want a good meal while anywhere in the Hoosier State run down to Kentucky.

A reputation for good food is not to be despised. For New Orleans and Paris it has won immeasurable affection. A single article of diet has made the names of some cities known the world over. Boston has lost her culture, but her pre-eminence in baked beans and brown bread is unchallenged. How many on this side would ever have heard of Bologna had not a patriotic butcher of that city once upon a time invented a convenient way of supplying soldiers with spiced minced meat while on the march? Munich and Muenchner, Bermuda and onions, Vienna and bread, Messina and lemons, Ireland and potatoes—they are as twined as roast beef and ale.

In honoring Kentucky's comestibles the Interstate shopped in the Blue Grass, in the mountains and in Louisville. It may never have occurred to Kentuckians before that they live uncommonly well. The Interstate deserves gratitude for discovering us to ourselves and to the rest of the world.

# Powerful Locomotives Built for Paris-Orléans Railway

**Record Made for Fast Long-Distance Operation—Designed for Maximum Speed of 81 M.P.H.—Each Axle Has Individual Drive**

WITH the opening of the electrified section between Paris and Vierzon on the Orléans Railway in France, a new European record was made for long-distance, high-speed operation. On Dec. 22, 1926, the first train, drawn by a powerful express locomotive specially designed for this service, covered this run of 204 km. (127 miles) in one hour and 57 minutes, at an average speed of 105 km. per hour (65 m.p.h.). Over considerable distances a speed of 125 km. per hour (78 m.p.h.) was maintained. The locomotive used on this initial trip was one of two built by the Swiss Locomotive & Machine Works, Winterthur, and equipped electrically by Brown, Boveri & Company, Baden, Switzerland.

Since these express locomotives have been in use on the Paris-Vierzon section it has been possible to shorten the running time substantially. Formerly the journey between Paris-Austerlitz and Les Aubrais occupied 92 to 100 minutes, and that from Aubrais to Vierzon 74 to 76 minutes. After electrification it became possible for trains of 530 metric tons (584 U. S. tons) to operate over these two sections in about 75 minutes and 55 minutes respectively.

The axle arrangement used on the new locomotives is 2-D-2, there being a four-wheel guiding truck at either end, with eight driving wheels between. A one-hour rating of 4,000 hp. is obtained at the wheel treads at a speed of about 73 km. per hour (45 m.p.h.). A continuous rating of 3,300 hp. at a speed of about 78 km. per hour (48 m.p.h.) can be developed. The one-hour tractive effort on the wheels is about 31,960 lb. and that at the continuous rating is 25,350 lb. A drawbar pull of 47,600 lb. can be exerted at starting, i.e., 30 per cent of the 72 metric tons adhesion weight. The loading of the driving axles is 18 metric tons, which is the limit for this railway; the axles of the guiding trucks, which are non-symmetrically placed, carry 10.5 tons and 13 tons, hence the total weight of the locomotive is 119 tons.

Conditions of design were that the locomotives should attain a speed of 130 km. per hour (81 m.p.h.) on a suitable permanent way, and also, at low speeds, be able to traverse curves having a radius of 80 m. (265 ft.). These conditions led to the use on each locomotive of a two-axle truck, fitted with a spring centering device. Individual axle drive was used. This type of drive has been in service for a considerable period on 50 locomotives of the Swiss Federal Railways and elsewhere.

The electrical equipment consists of four 1,500-volt d.c. driving motors, provided with both self-ventilation and external ventilation. Motors can be connected in series, series-parallel or parallel, according to requirements. By the application of field-weakening taps and by shunting parts of the field eleven economical running steps are provided in one of the two locomotives and in the other, thirteen. By the arrangement of each motor group, twelve resistance steps can be obtained, so that besides the running positions already mentioned, 36 other steps are provided which make smooth starting possible. An auxiliary motor-generator set for 1,500/72 volts, connected in parallel with a battery, operates the pilot motor connected to the main controller. This auxiliary set also supplies current to the lighting circuit. The motor compressors and the ventilating motors are designed for a potential of 1,500 volts and are switched in or out, over a small resistance, by a contactor. Current may be obtained from the contact wire by means of two pantograph collectors, or it may be obtained from the third rail by shoes. Experience thus far indicates that the electrical equipment will prove satisfactory and suitable for the work required.

Paris-Vierzon Express on Paris-Orléans Railway Drawn by One of the New 1,500-Volt High-Speed Locomotives

# The Readers' Forum

## *What Does the Public Want — Low Car Fares or Service?*

RICHMOND BOROUGH
NEW YORK CITY, Feb. 28, 1927.

To the Editor:

Staten Island, being the borough of Richmond of the city of New York, is vitally interested in the local bus situation. Trolley service has been given on Staten Island for the past 30 or 40 years. Two years ago an independent company started a bus system, most of which is in competition with the trolley company. There is, however, a real need for bus service in newer sections not reached by the rail lines, and also to replace the municipally operated trolley which the city seems anxious to abandon. The bus system now operates without a franchise.

Both the bus system and the trolley company, through a subsidiary, have made application to the Board of Estimate for a permanent bus franchise. The Staten Island Coach Company, the trolley subsidiary, offered an 8-cent fare with universal free transfers from and to all cars and coaches north of Richmond, which includes all but two unimportant lines. The Tompkins Bus Corporation offered a 5-cent zone fare. Transfers were offered at a 2-cent charge, at some points free and at other points none. The transfer feature of the offer was not well understood.

The borough president favors one of these parties, though he has expressed himself as willing to abide by the decision of the public. To obtain the general public sentiment, a local newspaper started a voting and letter-writing contest, in which prizes of $25 were offered for the best letters on the bus franchise question.

An examination of these letters as printed in the newspaper is very interesting. The following is a compilation of the subjects discussed in the 116 letters published:

| | |
|---|---|
| Priority of service | 23 |
| Courtesy of employees | 31 |
| Amount and quality of service | 84 |
| Condition of equipment | 37 |
| Financial responsibility | 45 |
| Fare | 70 |
| Safety | 12 |
| Speed | 7 |
| Public relations | 33 |

Naturally the number of subjects exceeds the number of letters, since each letter, on the average, discussed about three topics.

In interpreting these data, a number of things must be kept in mind. For one thing, the letter writers may not represent a fair cross-section of the community, since there were but 116 letters from a population interested of at least 125,000. Also the people of Staten Island may not be representative of the country at large, the people in New York City being notably uninformed about transit matters in general and unacquainted with the progress which has been made in cities where the political influence against efficient transit service has not been so great.

Many of the writers undoubtedly considered speed, safety and equipment under the general heading of service, although the topics discussed under service in most of the letters were about headway, reliability, freedom from breakdowns, territory covered, night cars, etc. The speed of both prospective operators may have been taken for granted as about alike. Courtesy must have been in the minds of those letter writers who discussed the service.

On the subject of fare, those who live within a 5-cent ride of the ferry were strong for the zone system. Those who live further out, where 10, 15 or 20 cents for two, three or four zones would be charged, preferred the 8-cent fare with universal free transfers. One thing stood out, that almost every letter admitted the absolute impossibility of a straight 5-cent fare. The losses of the municipal venture here were offered as proof. There was also a strong sentiment for a straight 10-cent fare with good service, although unfortunately a few writers haggled over pennies here and there. If a clear-cut conclusion may be drawn from the letters printed, with the complicated fare structure outlined, it was that the people wanted good service, and realized that they would have to pay a fare that would purchase the service desired.

The interesting deduction may be drawn that even in New York City service is preferred to the fare, though the fare looms large over other factors. The surprising thing is that speed and safety, at least in city service, were mentioned by so few people.

FELIX E. REIFSCHNEIDER.

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## *Atlanta Devotes Much Attention to Car Appearance*

GEORGIA RAILWAY & POWER COMPANY
ATLANTA, GA., Feb. 2, 1927.

To the Editor:

Atlanta is evidently doing her part to get rid of those 25,000 obsolete electric cars. In the last three years she has set the torch to 170 old cars, with ages ranging from 20 to 28 years, and in their place are 196 new four-motor, low-floor cars, weighing 37,500 lb. each. This has resulted in better looking cars, increased rates of acceleration, higher speed, quicker stops and a more satisfactory service.

Free discussion indicates that today individuals are expecting more comfort and speed, and in response to this many electric cars now have rubber tile flooring, deep-cushioned individual seats and streamline exteriors in attractive colors. Present-day cars cost a lot of money, all the way from $14,000 to $18,000 each, and there is no doubt that in many cases the providing of new equipment has been a Herculean task. Now that there are a lot of them in service throughout the country "all dolled up" and looking good an increased responsibility falls on the maintenance department in order to keep them attractive.

If the rubber tile floor cannot be kept clean, if the upholstered seats are not re-covered perhaps every two or three years and if the attractive exterior is not kept clean by running the car through the paint shop at least every sixteen months, much of the attractiveness may be lost. It is also necessary to provide a fairly smooth and comfortable track for these new cars to run on or else the looked-for gain in receipts may not be realized.

W. H. MCALONEY,
Superintendent of Equipment.

# Maintenance Notes

## Headlight Resistor Withstands Climate

SPECIAL headlight resistance units are being installed on the Key Route cars of the Key System Transit Company, Oakland, Cal. The unit is placed in series with the headlight to cut down the trolley voltage to approximately 110 so that a 250-watt, 110-volt lamp may be used.

Special Headlight Resistor, Made of Chromalux Units, Which Withstands Sewer Gases, Salt Air and Fog on the Key Route

The Units Are Mounted on a Wood Framework Which Is Suspended Under the Car

*Use best renewals; substitutes*
*Will soon leave you destitute.*

The unit is of a special material known as Chromalux, manufactured by the Edwin L. Wiegand Company. It has the properties for withstanding the salt air, fog and sewer gases encountered on the pier route of the Key System. The units are mounted on a wood framework which is suspended under the car, either at the center or under the end frame, where the resistor is subject to all climatic and road conditions. As will be seen in the accompanying illustrations, the resistors are protected by a copper mesh screen.

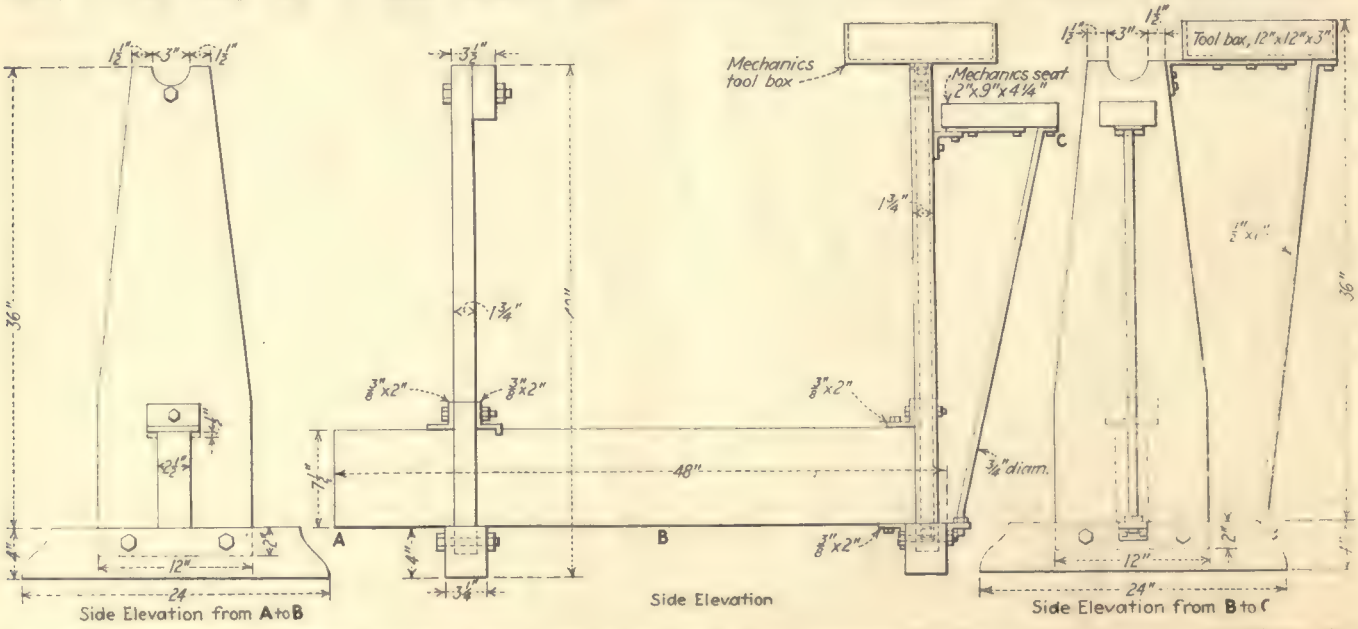
## Adjustable Armature Winding Stand

REPAIR and winding of armatures in the shop of the Lynchburg Traction & Light Company, Lynchburg, Va., has been simplified to a marked degree since Master Mechanic Cochran designed and built an adjustable armature stand. The adjustable feature provides a range of pedestal centers that will accommodate the smallest air compressor armature or the largest railway motor armature.

The stand is made of well-seasoned oak. When assembled it occupies a floor space of approximately 24 in. x 48 in. The base consists of two 3¼-in. x 4-in. x 24-in. oak beams and the armature supports are made of 1¾-in. lumber of semi-tapered design with a 12-in. base and a 6-in. top. Each base beam has a recess gouged out 1¾ in. x 2 in. x 12 in., in which is installed the base of the armature support, held in place by two ½-in. machine bolts. One end of an oak timber 2½ in. x 7½ in. x 45¼ in. is fastened to the commutator end armature support by two substantial steel angles. The other end is placed through a 2½-in. x 7½-in. hole in the pinion end armature support. This allows the latter to be moved toward or away from the commutator end support as desired for the armature to be worked upon. Two angles are fastened to the movable armature support. One has a projection extending down on either side face of the 45¼-in. beam and acts as a brace to prevent tipping and a guide to assure alignment at all times.

An added feature is a workman's semi-revolving seat 2 in. x 9 in. x 4¼ in., and a tool and material box 12 in. x 12 in. x 3 in. fastened to the commutator armature support.

Due to its portability this armature stand can be moved to any part of the shop to facilitate working conditions, especially to secure daylight.




General Appearance of Adjustable Armature Stand Used in the Shop of the Lynchburg Traction & Light Company, Lynchburg, Va.

Tilting Table Circular Saw in the Capital Traction Company Shop, with Lumber in Place and Table Set for Angle Cut

## Modern Sawing Machine Saves Material and Labor

LUMBER for window, door and vestibule posts was a very large item in the carpenter shop budget of the Capital Traction Company, Washington, D. C., until W. H. McCarty, master mechanic, installed a modern sawing machine. The magnitude of the lumber item was not entirely due to the number of posts required for repair work but rather to the unavoidable waste of material on account of cutting posts with a certain angle by means of an obsolete circular saw. The machine installed to obviate this is an individual motor-operated American No. 10 Model 3 tilting table circular saw.

Where it was possible to cut only two door posts from a certain piece of stock three of these posts can now be made and the waste is extremely small. On this one class of work alone the lumber saving has amounted to at least 35 per cent and the number of operations reduced 75 per cent. Similar saving in material and operations has been shown in practically all of the work where angle cutting is required. It is believed that the machine has fully paid for itself in the few months it has been in service.

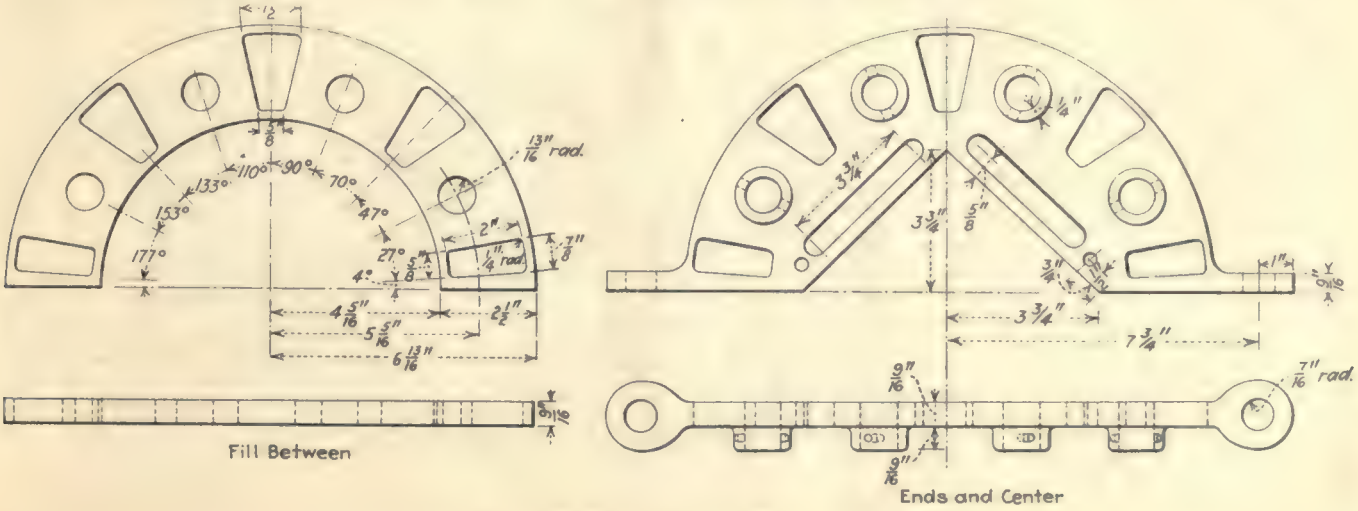
## Improving Sweeper Brooms

By William J. Smith
Master Mechanic Community Traction Company, Toledo, Ohio

SNOW fighting has not been so great a cause for anxiety on the lines of the Community Traction Company, Toledo, Ohio, since the development in the shop of a new casting for the brooms. Formerly the broomsticks for snow sweepers were inserted through small holes in an iron casting, turned through the back and pushed through a similar hole in the casting about 12 in. away. A board clamped to the back of the casting held the broomsticks in place.

This method proved very unsatisfactory. Not only did the sticks break when they were inserted in the small holes but the board clamped against them turned them at such a sharp angle that they soon broke off in service. During a snowstorm it was customary to have three or four men working overtime to keep the brooms in repair.

A new type of casting has now been developed in which the broomsticks are placed in position in a U-shaped aperture and held firmly in place by an iron rod run through after an entire row has been placed. Since this method was adopted no men have been worked overtime to keep the brooms in repair and they outlast the old style which they replaced.



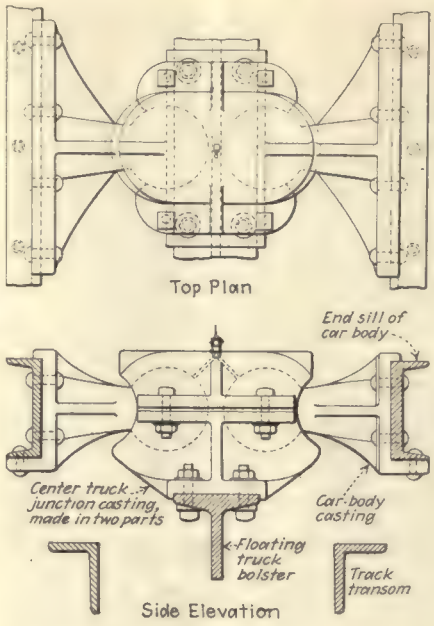

New Broom Castings Overcome Breakage Troubles

# New Equipment Available

## Universal Joint Coupler for Articulated Cars

FOR joining articulated car units a new type of universal joint coupler is being marketed by the Universal Car Parts Corporation, Baltimore, Md. The coupler is the invention of Joseph M. Suarez and includes four castings designated as lower socket, upper socket and two car end connections. Each of these latter parts has a ball which fits into a hemispherical socket in the lower and upper socket members. The lower member is secured to the bolster on the center truck and the upper one is fastened to the lower, thus providing two complete ball sockets which engage the respective balls of the car end connections.

Each car end connection is thus free from engagement with the other and can be disconnected from the center truck without interference with the other car end. The two-ball coupler is designed to take track curves of short radius such as are encountered in electric railway service. The lower sockets retain the lubricant and the pocket construction prevents waste. The upper and lower socket members are separated by gaskets which can be adjusted to compensate for the wear of the ball joints.




Construction of Universal Coupler for Articulated Cars

## COMING MEETINGS OF *Electric Railway and Allied Associations*

*March 16-17* — Central Electric Traffic Association meeting, Lincoln Hotel, Indianapolis, Ind.

*March 17-18*—Illinois Electric Railway Association, seventh annual joint convention, Hotel Abraham Lincoln, Springfield, Ill.

*March 24*—New England Street Railway Club, annual meeting and banquet, Copley-Plaza Hotel, Boston, Mass.

*April 1*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

*April 26-29*—Southwestern Public Service Association, convention, New Orleans, La.

*May 31—June 1-2*—Canadian Electric Railway Association, annual convention, Winnipeg, Man.

*June 6-8*—American Association of Engineers, annual convention, Tulsa, Okla.

*June 24-25*—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

*July 27-29*—Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.

*Oct. 3-7*—American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio.

# Association News & Discussions

## Prizes to Be Awarded for Papers on Arc Welding

THE sum of $17,500 has been placed with the American Society of Mechanical Engineers by the Lincoln Electric Company, Cleveland, Ohio, to be awarded by the society for the best three papers disclosing advancement in the art of arc welding, presented under the rules of the competition. The prizes to be awarded are $10,000 for the first, $5,000 for the second and $2,500 for the third. The purpose of the competition is to encourage improvement in the art of arc welding, the pointing out of new and wider applications of the process, the discoveries of improved methods of testing welds to insure their integrity, or indicating advantages and economies to be gained by its use.

The competition will be judged by a committee of the American Society of Mechanical Engineers and any one may compete. Papers must be sent in duplicate to the secretary, Calvin W. Rice, 29 West 39th Street, New York, N. Y. All exhibits must also be in duplicate and captions, titles, legends and notes must be in the English language. All papers must bear evidence of having been sent before Jan. 1, 1928, in order to be considered and must be received by Jan. 31, 1928.

Every paper should include necessary drawings, photographs or other exhibits, in order that the disclosures may be complete. Originality of design is preferable, either in the method of applying the weld or in the design of the welding parts for their arrangement. Designs which are of no practical use will be considered only in case they include suggestions which could self-evidently be applied in other ways than those suggested. Methods of applying the arc or the welding art, which will improve existing machines or make commercially possible machines which in the light of previous engineering have been regarded as impractical, are specially desired.

In submitting papers each competitor gives the American Society of Mechanical Engineers the right to publish the paper should the society desire to do so. No papers will be returned to any competitor. It is the purpose of the American Society of Mechanical Engineers to present these awards at the stated spring meeting of the society in 1928. All competitors will be notified promptly of the action of the judges. The American Society of Mechanical Engineers has issued a bulletin giving complete information regarding the competition. Copies of this may be obtained by addressing the secretary.

## New England Club Banquet March 24

PLANS are well under way for the 27th annual banquet of the New England Street Railway Club. As is customary, it will be held March 24 at the Copley-Plaza Hotel, Boston. Dinner will be served at 6:30 p.m. for members and gentlemen guests. Music will be furnished by the Connecticut Company Employees' Band.

Edward Dana, general manager Boston Elevated Railway, will be toastmaster. The speakers will be Gov. Alvan T. Fuller of Massachusetts, Mayor Malcolm E. Nichols of Boston, Hon. B. F. Cleaves, former chairman Maine Public Utilities Commission, and Frank P. Sibley, special correspondent of the Boston *Globe*.

The annual meeting of the club will be held at the hotel at 3 p.m., at which time officers for the ensuing year will be elected.

## Central Master Mechanics Appoint Committee

COMMITTEE appointments of the Central Electric Railway Master Mechanics Association have been announced for the present year by President G. R. Green. A full list of appointments follows:

*Executive* — G. R. Green, president C.E.M.M.A., general superintendent Chicago, South Bend & Northern Indiana Railway,

chairman; F. J. Foote, vice-president C.E.M.M.A., Springfield, Ohio; L. E. Earlywine, secretary C.E.M.M.A., Indianapolis, Ind.; Charles Sigler, Warsaw, Ind.; T. H. Nicholl, Anderson, Ind.; J. W. Osborn, Elyria, Ohio; A. W. Reddersen, Fort Wayne, Ind.

*Arbitration* — J. B. Corderman, master mechanic Lima Toledo Railroad, Lima, Ohio, chairman; R. E. Cornwell, South Bend, Ind.; H. F. Coleman, Fort Wayne, Ind.; Theodore Cox, Springfield, Ohio; R. C. Taylor, Albion, Mich.

*Membership* — R. E. Twiggs, master mechanic, Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, chairman; A. W. Brownsworth, Sandusky, Ohio; W. J. Smith, Toledo, Ohio.

*Reclassification of Accounts*—P. V. C. See, superintendent of equipment Northern Ohio Power & Light Company, Akron, Ohio, chairman; T. H. Nicholl, Anderson, Ind.; A. W. Reddersen, Fort Wayne, Ind.; C. M. Bange, Scottsburg, Ind; J. W. Osborn, Elyria, Ohio.

*Standardization*—T. H. Nicholl, superintendent of motor power and equipment Union Traction Company of Indiana, Anderson, Ind., chairman; A. W. Reddersen, Fort Wayne, Ind.; C. E. Snyder, Tippecanoe City, Ohio; Charles Sigler, Warsaw, Ind.; J. F. Seigle, Newark, Ohio; J. D. Barnhart, Decatur, Ill.; C. M. Bange, Scottsburg, Ind.

*Subjects*—A. J. Challeen, superintendent of shops Detroit United Lines, Highland Park, Mich., chairman; J. B. Corderman, Lima, Ohio; J. W. Osborn, Elyria, Ohio; W. J. Fox, Scottsburg, Ind.; G. A. Stiles, Columbus, Ohio.

*Uniform Charges for Repairs to Interchanged Equipment*—W. A. Coleman, superintendent Dayton & Western Traction Company, West Alexandria, Ohio, chairman; A. F. Rolston, Stratford, Ohio; Allan Karns, Bowling Green, Ohio; Theodore Cox, Springfield, Ohio; M. M. Lloyd, Michigan City, Ind.

# American Association News

## Exhibit Committee Appointed

PRESIDENT W. H. SAWYER of the American Electric Railway Association has announced the personnel of the exhibit committee for the 46th annual convention and exhibit, scheduled to take place in the Cleveland Public Auditorium and Annex, Oct. 3 to 7 inclusive. Col. J. H. Alexander, president Cleveland Railway and chairman of the exhibit committee, has called a meeting of the entire committee at his office, Hanna Building, Cleveland, Ohio, for 10 a.m., Friday, March 18. This meeting is for organization purposes, to go over and approve pending contracts, to lay out floor space showing detailed arrangement of booths, etc. The personnel of the committee is as follows:

Col. J. H. Alexander, president Cleveland Railway, Cleveland, Ohio, chairman.
C. E. Morgan, Brooklyn, N. Y., vice-chairman.
J. W. Welsh, New York, N. Y.
Fred C. J. Dell, director of exhibits, A.E.R.A., New York, N. Y.
H. H. Adams, Chicago, Ill.
L. D. Bale, Cleveland, Ohio.
Herman Bender, Cleveland, Ohio.
C. P. Billings, Pittsburgh, Pa.
R. M. Campbell, Philadelphia, Pa.
T. W. Casey, New York, N. Y.
C. H. Clark, Cleveland, Ohio.
J. F. Collins, Jackson, Mich.
S. G. Down, Wilmerding, Pa.
B. C. Edgar, Nashville, Tenn.
J. F. Egolf, Highwood, Ill.
H. F. Flowers, Findlay, Ohio.
Charles Gordon, New York, N. Y.
L. E. Gould, Chicago, Ill.
R. N. Graham, Youngstown, Ohio.
R. A. Hauer, New York, N. Y.
C. S. Hawley, Albany, N. Y.
B. A. Hegeman, Jr., New York, N. Y.
A. P. Jenks, Chicago, Ill.
A. E. Kasemeier, Cincinnati, Ohio.
H. J. Kenfield, Chicago, Ill.
G. L. Kippenberger, St. Louis, Mo.
S. P. McGough, Chicago, Ill.
J. S. Pevear, Birmingham, Ala.
A. L. Price, Mansfield, Ohio.
Harry Reid, New York, N. Y.
A. M. Robinson, Philadelphia, Pa.
S. P. Seward, Cleveland, Ohio.
L. W. Shugg, Schenectady, N. Y.
D. W. Snyder, Jr., Springfield, Ill.

## Purchases and Stores

PREPARATION of the report to be presented at the annual convention of the Engineering Association occupied the attention of the committee on purchases and stores at a meeting held on March 1 and 2. The committee met in the offices of the Virginia Electric & Power Company at Richmond, Va., on invitation of J. Y. Bayliss, director of purchases and supplies. Other members present were John Fleming, chairman; B. W. Forkner, A. A. Ordway, W. J. Walker and A. E. Hatton.

**Members of Committee on Purchases and Stores at Recent Richmond Meeting**
From left to right—B. W. Forkner, A. A. Ordway, W. J. Walker, A. E. Hatton, John Fleming and J. Y. Bayliss.

## Metropolitan Section Keeps Posted

NEW developments in the transportation industry were discussed at a well-attended meeting of the Metropolitan Section, A.E.R.A., held at the Engineering Societies Building, New York City, March 4. Various phases of the business were treated by the several speakers selected by the sponsor group committee, of which C. R. Jones was chairman.

J. B. Donley, director of public relations Pittsburgh Railways, told of the new ideas developed to sell transportation. He outlined the various steps through which the company has passed from receivership to its present enviable position. How new franchises were secured and friendly relations established with municipal authorities and with the general public were brought out. He gave interesting information on the recent "Ride the Trolley Week" which was the subject of a comprehensive article in ELECTRIC RAILWAY JOURNAL for Jan. 29. Particular emphasis was laid on the policy of the management to lay all its cards on the table in dealing with the public and its employees.

On account of the illness of Charles Gordon the subject of recent developments in car equipment was discussed by John A. Dewhurst, associate editor ELECTRIC RAILWAY JOURNAL. He brought out forcibly the influence which the automobile has had upon the local transportation situation. The industry has changed from a non-competitive necessity to a competitive convenience, he said. This has made it necessary to improve the common-carrier vehicle to a point where its service approaches that of the private automobile in comforts and attractiveness. He mentioned the importance of light-weight construction, improved seats, automatic treadle exits and similar features. His talk was illustrated by lantern slides showing new cars operated on various electric railways throughout the country and interesting details.

Moving pictures illustrating the latest transportation developments in the metropolitan area were presented by Horace Sisson of the Sisson Supply Company. Included in this were views taken on the properties of the Richmond Light & Railroad Company, Brooklyn City Railroad, New York Railways and Public Service Railway.

E. M. T. Ryder, way engineer Third Avenue Railway, spoke briefly about the latest things in track construction. He called attention particularly to the method used by his company in making butt-welded joints. H. F. Merker, chief engineer Brooklyn City Railroad, also spoke briefly on track matters, but expressed a view somewhat different from that of Mr. Ryder concerning butt-welds. He spoke of the importance of ELECTRIC RAILWAY JOURNAL as an agency to keep the industry posted on developments.

The meeting was concluded with a talk by James O'Shaughnessey, National Association Advertising Agencies. He told how advertising has made friends for countless manufactured products and pointed out its possibilities as a means of winning public favor.

# The News of the Industry

## Money for Bondholders

**Redemption and Interest on Seattle Railway Paid—Extension of Time on Purchase Bonds Defeated**

Ignoring an order of the Superior Court temporarily tying up the funds, City Treasurer Ed L. Terry, Seattle, Wash., with the concurrence of other city officials, on Feb. 28 telegraphed $1,142,835 to the city's fiscal agent in New York, for payment of the bond redemption and interest due on March 1 on the Seattle Municipal Railway, purchased from the Stone & Webster interests in 1919.

Attorneys for John G. Von Herberg, who is suing the city to force the payment of salaries and other costs of operation ahead of installments on the purchase bonds, refused to enter into a stipulation, as demanded by Corporation Counsel T. J. L. Kennedy, whereby the city would be permitted to make the bond payment when due. Mr. Von Herberg charges as unlawful loans totaling $735,000 from the city light department to aid the municipal railway in its present entanglement of finances and litigation. In Mr. Kennedy's diagnosis of the situation, a successful prosecution of the specific performance suit brought in federal court by the Puget Sound Power & Light Company against the city would be likely if the city defaulted on the purchase bonds, in which case the city would have to operate the railway from money of the general fund, leaving first revenues of the railway for the holders of the purchase bonds.

J. G. VON HERBERG CONTINUES PROTEST

Attorney Robert P. Oldham, for Mr. Von Herberg, asserts that his suit for payment of salaries still stands, and the fact that salaries now may be paid from an "unlawful transfer of funds" does not affect the situation. Mr. Oldham points out that the city has violated the temporary restraining order of the Superior Court, and Mr. Von Herberg in an open letter protests against such action, and strongly criticises the Council for its action in violating a court order.

Efforts of the Puget Sound Power & Light Company to amend the bill now pending in the Washington Legislature providing for an extension of time on the Seattle Municipal Street Railway purchase bonds have failed in the Senate committee on cities of the first class.

The bill that was favored by the city was voted out of committee with the unanimous recommendation that it pass without the Puget Sound company's amendment.

A. W. Leonard, president of the Puget Sound company, after a conference with Mayor Bertha K. Landes, announced that his company will not pursue further its efforts to attach an amendment to the bill, because while he feels that the amendment is justified, it is feared it may defeat the entire measure, with the result that all negotiations for bond extensions would be held up until another session of the Legislature.

The amendment, in the opinion of Corporation Counsel T. J. L. Kennedy, Mayor Landes and other city officials, would have the effect of making the extended bonds a general obligation of the city, instead of merely a lien on the gross revenues of the street railway utility. Puget Sound officials insist that the amendment was merely for the purpose of restoring the bonds to the same status they have at present.

Another phase of the railway financial troubles came up when the United States Supreme Court in Washington, D. C., on Feb. 28 announced that it would not act as referee in the $545,000 tax battle between the Puget Sound Power & Light Company and the city, and dismissed applications for writs of certiorari filed by the litigants. This decision means that the city's general fund is not liable for the payment of the city's share of the street railway taxes for 1919. The Circuit Court of Appeals held that the street railway must pay the taxes, but that the money must come from the revenue of the utility. The Puget Sound company filed application for a writ of certiorari on the ground that the taxes should be an obligation against the city. The city, contending that the city does not owe the tax money, filed application for a cross writ of certiorari. The dismissal of both applications leaves the decision of the Circuit Court of Appeals still in effect.

## Fare Change Sought

**Company at Houston Desires Sliding Scale—Needs $1,000,000 to Keep Pace with Growth of City—Auto Registration Increased in Six Years—Bus Service Unprofitable**

IN A petition filed Feb. 28 with the City Council of Houston, Tex., the Houston Electric Company proposes a fare adjustment based on a sliding scale, which would permit regular patrons to enjoy the same rate as heretofore, or possibly less, the occasional rider to pay as high as 10 cents. The company states that an increase in fare is necessary to realize an adequate rate of return on its investment. Profits for 1926 were scarcely more than 3 per cent. Expenditures totaling $1,000,000 will be necessary in 1927 to keep pace with the development of the city. In a full-page advertisement, signed by Jeff L. Alexander, manager, the people of Houston are acquainted with the plan of the company.

Mayor Oscar Holcombe said that the city would take time to consider whether the adjustment was merited. An investigation will be made and a hearing held, the Mayor explained. While the Council is investigating the requested rate adjustment, the company plans to lodge a campaign of public information by distributing circulars on cars and buses and using newspaper advertising to tell why the increase is needed.

The company introduces its petition with the explanation that within a short time the three-year construction program, outlined in an agreement between the company and a committee of citizens of Houston, will have been completed. The company obligated itself to spend $1,500,000 within three years on extensions. Other improvements not included in the agreement have been carried out by the company and the total expenditures to date have been $1,650,000. The company now claims that $1,000,000 is needed to keep pace with the growth of Houston and presents the problem of from what source the $1,000,000 of new money can be secured.

With a record of earning only $4,905 with which to pay interest on the $3,627,358 of new money invested during the past thirteen years, it was easy to understand why investors do not want to purchase additional securities of the company. According to the petition the people of Houston have purchased securities liberally, believing, as did the company, in the future of public transportation and the fairness of the citizens and city authorities to permit the company to earn a reasonable return on money so invested. While the interest has been paid on the securities it has come as a sacrifice from the original security holders, and if further securities should be offered and sold the interest paid on them would in turn come as a sacrifice from the present holders of securities located in Houston and elsewhere. Under the circumstances, the company would not be justified in asking people to invest further in the company's securities and could not expect them to do so.

The difficulties through which the company has passed since the outbreak of the European war were enumerated in a brief historical summary included in the petition. Mention was made of the operation of jitneys which depleted the revenues of the company, the expansive improvement program and the

substantial addition to its investment. The relief offered through various means would have proved sufficient to keep the company in good financial condition, except for further depletion of the revenues by diversion of traffic from its cars to privately owned automobiles. The effect of the ownership and use of private cars was shown by the number of revenue passengers on the Houston car lines since 1920 and Harris County's auto registration during that same period. The auto registration for the year ended Dec. 31, 1920, was 22,032, and for 1926, 60,922. The number of revenue passengers in 1920 was 35,222,621 and in 1926 42,082,-233. Elimination of the jitneys helped to increase the number of passengers on the car lines from 1923 to 1926. To regain by an increase in fare from present car riders the revenue lost through automobile development would mean an increase in the present fare of more than 3 cents per ride.

Reference was made in the petition to the efforts made to facilitate riding —the means to make the service more attractive, the advertising and general merchandising methods and the investment in buses being proposed to that end. The bus operation, however, has been unprofitable, the amount earned on the investment being less than 1 per cent. However, the petition states the net result is more satisfactory than the investment in car lines would have been to serve the same territory.

The service now needed cannot be provided until new equipment is purchased. Plans and specifications for new cars of modern design are now in the hands of the car builders awaiting orders to begin work. The additional revenue needed for the purposes above enumerated plus added taxes to be paid to the city and state on gross earnings is equivalent to an additional fare of approximately 1½ cents for each passenger now carried.

A schedule of rates should be promulgated which will permit those who use the service regularly to pay a fare considerably less than those who use it occasionally. The wholesale rate would be made available by the purchase of a weekly ticket sold by the trainman, which when presented to the operator would entitle the bearer to ride for a 5-cent fare, the ticket to be transferrable and made available for use by any member of the family, or any one else who may present it. Under the plan of a wholesale rate or sliding scale of fares the additional revenue needed by the company would be paid very largely by those who use the service only occasionally. The infrequent rider, who uses the automobile except when it is not available, certainly should not object to paying a cash rate not to exceed 10 cents, particularly if tokens were sold at a liberal discount.

In conclusion the petitioner stated:

In asking for this adjustment, it is not our purpose to secure a rate which will produce any more revenue than is necessary for the company to put its finances in condition to maintain proper service and continue as a factor in the development of the city. There are those who will, of course, hold views different from the conclusions we have reached, and to them or any one else we desire to extend an invitation to ask for or call to secure any further information necessary for thorough understanding of the matters herein discussed.

## Beaver Valley Honors Twenty-five-Year Men

In New Brighton, Pa., there were reunion and rejoicing recently in celebrating the affiliation of thirteen employees with the company for 25 years or more. A feature in this connection has been the organization of the Twenty-Year Club, in which, in addition to the 25-year men, will be included five more men who will reach the 25 years of service mark during the current year.

A banquet was held at the Pittsburgh Athletic Association Club to permit A. W. Robertson, the president of the Philadelphia Company, and Vice-President Thomas F. Fitzgerald, former General Manager W. H. Boyce and Personal Director W. G. Marshall to be present. The trip was made by Beaver Valley motor coaches and was one of the high spots of the occasion, which later reached the point of solemnity when the officers of the company, in their addresses, referred to the loyalty of the group of men and pictured the happenings of joy and sorrow in the 25-year period which they had served their company and the public.

Clinton D. Smith, general manager, presided at the banquet and presented each of the men to the officials of the parent company. In doing this he briefly sketched events in the life of each, saying: "I find inspiration and keen pride in reviewing the service of these men and their contribution toward the prestige, stability and success of our company."

In token of the service rendered and the continuity of it, General Manager Smith presented a gold watch charm to each of the thirteen men. The face of this charm bore a reproduction of the service with the figures "25 years," while the back bore the name of the employee and the date he began work. A. W. Robertson, president, and Thomas Fitzgerald, vice-president, both made grateful reference to the long term of employment and expressed a bright future for the property in the group represented.

Mr. Boyce, the former general manager, referred to his personal contact and told some of the experiences during the early days of the local lines when track, cars and equipment were not so efficient as they are today.

Of the thirteen men, two have been pensioned and eleven are still in active service with the Beaver Valley Traction Company. They are J. R. Marshall, superintendent of transportation; H. J. Meyer, superintendent of equipment; W. F. Allshouse, track supervisor; I. J. French and David Hall, pensioned employees; W. J. Moffett, P. F. Householder, C. P. Hayward, A. E. Price, H. McMillen, John Myers, William Myers and Robert J. McClymonds.

During 1927 the five men who will reach the 25 years of service mark are M. D. Ayers, W. T. Byers, James Davidson, James Graham, D. Lee Noss and Alex Webster. This will make a total of seventeen men who have been with the company 25 years, practically 10 per cent of the total number employed locally. The Twenty-Year Club will perpetuate for all time the tribute due those who have served and continue to serve faithfully a community of people.

I. J. French W. J. Moffett Clinton D. Smith, Manager John Myers C. P. Hayward

David Hall P. F. Householder

**Twenty-five-Year Men of the Beaver Valley Traction Company**

Albert Price Wm. Myers

Henry McMillen W. F. Allshouse John R. Marshall R. J. McClymonds H. J. Meyer

## Kansas City Grant Ready

The proposed 30-year franchise for the Kansas City Public Service Company, the successor to the Kansas City Railways, was introduced in the Council on March 3 at a special meeting called for that purpose. It was referred, without discussion, to the Council as a committee of the whole for public hearings. Attached to the ordinance was a report of the special committee in whose name the measure was introduced. The report set forth the leading provisions of the proposed grant and unanimously recommended its adoption.

Mr. Gossett, the chairman of the committee, said the ordinance was not introduced at a special meeting in an attempt to hasten matters; that it would take its usual course through the Council, and that public hearings would be had as long as necessary. He said it was the desire of the committee that the ordinance come up for final action on March 21. Should it be passed on that date it would become effective March 31. The company would have twenty days in which to accept it. The grant not being for more than 30 years, the action of the Council is final, under a provision of the charter, and will not have to be submitted to a popular vote.

The franchise committee has been at work since early in November, following the adverse referendum. On Dec. 11 the committee submitted to the Council its recommendations for the basis of the ordinance. Those the Council adopted unanimously on Dec. 20, reserving the right to withdraw its approval if the suggestions were not generally followed.

## Will Appeal for Eight Cents in St. Louis

Receiver Rolla Wells of the United Railways, St. Louis, Mo., is preparing to appeal to the United States Supreme Court in an effort to regain the 8-cent fare or two tokens for 15 cents rate which was temporarily in effect under a federal court injunction from Feb. 7 to March 1. Thomas E. Francis, counsel for Receiver Rolla Wells, has already notified City Counselor Muench that an appeal to the highest court would be made. The city will vigorously resist the petition. A special court composed of three federal judges sitting at Kansas City refused to make the temporary fare permanent and ruled that the company was not entitled to the raise, but should await action by the Missouri Public Service Commission, before which an application for the 8-cent fare has been pending since June 7, last.

## Delay in Brooks-Coleman Act

Proposed repeal of the Brooks-Coleman act of 1921 placing valuation of electric railway properties and regulation of rates in charge of the Minnesota Railroad and Warehouse Commission seems lost at the present biennial session of the Legislature in St. Paul. The Senate adopted a report of the general legislation committee for indefinite postponement, 41 to 23. While the matter is still in the House it is not expected to come up. Five Minneapolis Senators voted for the report against three opposing. The bill was introduced by Senators Henry Morin of Duluth and Charles Hausler of St. Paul, both cities opposing the present law. The Senators who opposed the change hold that rate making should be in the jurisdiction of a disinterested body, such as the state commission, and that otherwise the law does not take away from cities the control of electric railways. The report of the Senators followed several public hearings in the Capitol.

## Progress in Campaign to Reclaim Michigan Road

After several months of solicitation for stock subscriptions, residents in the villages and communities along the abandoned Grand Rapids, Holland & Chicago Railway at a mass meeting on March 8, in Grandville, Mich., voted to purchase that part of the defunct road between Jenison and Grand Rapids. Authority to purchase was given by the campaign committee of the United Suburban Railway, as the new company will be known. According to Harold T. Slaght, chairman of the finance committee of the new company, the purchase price as arranged by his committee and representatives of the Heyman-Michaels Company, Chicago, which purchased the line at receiver's sale, is $30,000. The finance committee was also authorized to purchase and string new trolley wire at a cost of $7,500 and to purchase cars. The committee started on March 9 to complete the negotiations with the Michigan Railway for use of the tracks from the west city limits of Grand Rapids to the downtown station of the latter company. This agreement will be made on a car-mile basis which is considered favorable to economy in operation.

It was estimated that $52,250 would be required for the United Suburban Railway to begin operation. This would include the purchase price, the expense of the trolley wire, incorporation, insurance and the fund for operation. Reports at the mass meeting showed that $45,210 had been subscribed, leaving a balance of $7,040 to be raised before running of cars can be begun.

A call was authorized for a general meeting of the stockholders to be held in Grandville on March 21, to elect directors for one year. In the meantime members of the finance committee of the proposed company will meet with representatives of the Consumers Power Company, which owns the right-of-way, to arrange to have the new interurban lease the right-of-way on favorable terms.

Following a survey, Chairman Slaght said if the new line could carry as many passengers as had been carried by the old line it would make a profit. One big factor, he said, would help the new company. That was the possible elimination of personal taxes, as the line would be a community affair.

Leaders in the new company said there was a possibility of beginning service within the next 60 days. The line, double track, will be 8.3 miles in length. It will serve about 20,000 people in Burlingame, Beverly, Wyoming Park, and other sections.

## Co-operator Greets Operator in Philadelphia

The bonds of a new friendship between the management of the Philadelphia Rapid Transit Company, Philadelphia, Pa., and its employees were tied on Feb. 25 with the première of the P.R.T. *Co-operator*, acting as agent provocateur. Many employees have felt the need of this community of interests sheet and have suggested some such avenue of communication which might carry a message to the employees rather than to the stockholder and car rider as does *Service Talks*.

Not imposing but impressive is the exterior view of the initial number, with a Mitten moral on labor and profits boxed in its center. Its contents consume fourteen pages which fulfill the purpose of the booklet—an appeal to the employee. Here is an announcement of the company's campaign to win depositors for the Mitten Bank, in which every employee is a stockholder; also a bank statement that would satisfy a Ripley analysis, and portraits, too, of the employer and employee directors—a financial democracy shouting from the pages their faith in this system. And here's a page story of the company's new headquarters and an account of the saving fund transfer, and gossip—Motorman Weiss carries around with him lilies, fearing contamination with Philadelphia passengers. No! they are Ruskin's lilies—Sesame and Lilies.

Unfortunately the *Co-operator* will appear at no definite period, but happily when it does come it will have "something really worth saying." Fellow employees, avid in anticipation of this paper, are invited after a perusal to be critical in their comments, to be sent to 1520 Spruce Street.

## Life of Fellow Worker Saved by Lineman of Connecticut Company

John J. Borzillo, a lineman of the Connecticut Company, New Haven, by quick thought and daring action saved the life of a fellow-workman of the Winchester Repeating Arms Company who was untying cables at the top of a 40-ft. pole. The rescue took only ten minutes. Just in time to release the arm of the trapped man, who had caught it under one of the 500,000-circ.mil cables carrying 440 volts, a.c. on the bridge on which he was working, Borzillo jumped from the cage of the trolley line truck where he was removing a wire in order that the bridge might be raised and ran to the man, 200 ft. away. He stopped only a second to strap on his spurs and then climbed the pole, and with his foot placed against one of the crossarms lifted the feeder and pulled out the man's arm.

Winchester men who were working on the bridge job threw a rope to him from the roof of the building opposite. He caught it and tied it about his body and through the "D" rings of his body belt lowered himself and the rescued man to the ground. Two men working on the ground rushed the injured man to the emergency hospital, where he arrived in time to be treated. No serious harm resulted.

## Governors' Messages Concluded

The digest of the Governors' messages to the Legislatures which was started in these columns in the issue of Feb. 26 and continued in the issue of March 5 is concluded herewith. The states covered are Pennsylvania, Kansas, Oregon, North Carolina, Iowa and Idaho.

### PENNSYLVANIA

According to the message of Gov. John S. Fisher of Pennsylvania, it is the province of government to establish the rules under which the operation of public service companies shall be carried on efficiently, wisely and fairly. He said that in the natural sequence of events utilities developed in advance of governmental regulation. Out of the uncontrolled freedom of the early stages of the business there naturally arose abuses. It was to correct these and prevent their recurrence that instruments for supervision were fashioned by both the nation and the state. Sometimes they were created under strong reactions of popular resentment and were carried to unwise extremes, but in the main their influence has been salutary. Proper regulation, he believes, has proved as beneficial to business as to the public. The Public Service Commission of Pennsylvania was the agency established by the Legislature to deal with public utility problems and should be organized, sustained and equipped to carry out its functions of assuring to the people adequate service at reasonable rates. He believes the construction of the state highway system should be kept moving; while much had been accomplished, much remains to be done. He said that more stringent measures would have to be enacted for the safety of the highways and protection of the people. Uniform traffic regulations were desirable, but in establishing them sight should not be lost of the fact that conditions suitable for one community are not made burdensome for another.

### KANSAS

Gov. Ben S. Paulen, in his message to the Legislature, said that the state was confronted by the absolute necessity of better means of transportation. In connection with motor vehicle laws, he called the attention of the Legislature to the uniform motor vehicle code drafted and adopted by the national conference of commissioners on uniform state laws and approved by the American Bar Association. A uniform regulation of motor cars would come sooner or later, he believed, and since the state of Kansas was among the first in the number of cars per capita, it should adopt such regulations as would be for the public interest. On the important question of motor carriers, he believed that legislation should be enacted prescribing the manner in which bus lines operating through a number of taxing districts should be assessed for taxation purposes.

### OREGON

The details in connection with the administration of the laws relating to the licensing and regulation of the operation of motor vehicles on the highways of Oregon have now reached such proportions as to necessitate the separation of such duties from the present duties of the Secretary of State. The creation of a separate department of vehicles is desirable. This opinion was expressed by Gov. I. L. Patterson in his address to the Thirty-fourth Legislative Assembly. By vesting the administration department of the motor vehicle laws of the state in an official to be appointed by the Governor control is retained of the important offices that may be appointed, so that in the event that it be desirable at times that they be assigned to other duties necessary in maintaining the peace of the state they may be readily and speedily assigned. He recommended the appeal of that provision of the existing motor vehicle law imposing an additional license fee of 50 per cent on "motor vehicles not common carriers, . . . and used for commercial purposes. . . ."

### NORTH CAROLINA

In the interests of safety, Angus W. McLean, Governor, told the General Assembly that the time had arrived when it was necessary to enact a law requiring the registration of persons driving motor vehicles. He would recommend a law which would provide that licenses be issued only after a careful examination as to the character, habits, experience and general fitness of the applicant.

### IOWA

The abolition of the valuation department in the office of the Railroad Commission of Iowa was recommended in the inaugural address of John Hamill, Governor. He recommended that it be eliminated, inasmuch as the appraisement of the railroad properties under that department had no actual relation to the fixing of freight rates within the state, and neither was the valuation used in computing rates to be taxed to the railroad companies.

### IDAHO

H. C. Baldridge, Governor, in the nineteenth session speech, stressed the advisability of increasing the speed limit of motor vehicles to 25 m.p.h. outside of municipal limits. He recommended and urged the adoption of a uniform motor vehicle registration and certificate of title act, a uniform motor vehicle operators' and chauffeurs' license act, and a uniform act regulating the operation of motor vehicles on highways, this to be in accordance with the report of Herbert Hoover to the second National Conference on Street and Highway Safety.

## Traffic Survey of Metropolitan Boston

The City Council of Boston, Mass., has appropriated $25,000 for a comprehensive traffic survey of the metropolitan area under the direction of the Albert Russel Erskine Bureau for Street Traffic Research. The survey is expected to bring order out of the chaos of complex traffic regulations concerning parking, one-way streets, right or left turns, and by its detailed study of traffic movement provide the necessary data for the installation of an efficient system of traffic control. At present Boston's entire signal system consists of one multiple light signal pole operated by an officer from the sidewalk and two multiple light traffic towers operated by an officer from the inside of the towers.

Scientific study will be made of such subjects as causes of congestion, causes of accidents, rules of the road, pedestrian traffic and its protection, organization and operation of traffic police, installation and operation of traffic signals, design and installation of traffic signs and markings, the handling of traffic law violations and parking and garage problems.

The Boston survey is being conducted in co-operation with an advisory board on traffic, appointed by the Mayor, and composed of representatives of city departments, members of the Chamber of Commerce and representatives of all the leading bodies that may be affected by traffic changes to be proposed. It is the fourth metropolitan traffic study made by the Erskine bureau under the direction of Dr. Miller McClintock.

## Detroit Men Stimulated to Greater Effort

Gratifying results have followed the intensification during the past few months of the continuous campaign of the Detroit Municipal Railway, Detroit, Mich., in the interests of safety. The total number of accidents reported during January, 1927, was 30 per cent lower than that of January, 1926, and during the first ten days of February only 310 accidents were reported, as against 385 during the corresponding period of the previous month. Should this record be continued during the remainder of February a new low level will have been reached. During this same period one division, operating approximately 20,000 car-miles a day, established the remarkable record of running one entire day without a single accident.

Keen competition has been set up among the eight operating divisions by the presentation of a banner each month to the division showing the greatest reduction in the number of accidents over the preceding month. Then at the end of the year the division that has won the most banners is presented with a beautiful championship pennant. The men of each division are taking a great deal of pride in adorning the walls of their lobbies and recreation rooms with these banners and pennants, hence their zealous effort to avoid accidents.

In addition to this form of competition the trainmen on each division are grouped into teams consisting of twelve men. Each team elects its own captain and in a sportsmanlike manner endeavors to make the best showing on the division in the reduction of accidents.

The number of accidents chargeable to the various teams are charted each day on the bulletin boards at the respective carhouses, thus keeping the teams informed as to the progress during the month. At the end of each month boxes of cigars are distributed to the members that make up the team having the fewest number of accidents on each division.

## Summer Course at Harvard for Utility Executives

The Harvard University Summer School, in session from July 5 to Aug. 13, 1927, will include a course on public utility management and economics for public utility executives. Enrolment will be limited to 50 men and application should be made as early as possible to the Harvard Business School, Cambridge, Mass. Information concerning the living arrangements will be sent on request. The tuition is $100. Messrs. Philip Cabot and Deane W. Malott, in charge of the public utilities work in the Harvard Business School, will conduct the course, which is the equivalent of the full winter course offered in that school. Classes will meet daily from 10 to 12 a.m. and from 2 to 3 p.m. At least twenty hours a week preparation outside the classroom will be necessary. The course will require the full time of those enrolled.

## Passenger Service Over Houston North Shore Planned

Plans are being made to start passenger service over the Houston North Shore Railway line from Houston to Goose Creek, Tex. This electric railway line, 32.5 miles long, penetrates a territory hitherto without rail facilities. H. K. Johnson, president of the company, reports rails are now laid from Baytown to the Houston city limits. The line represents an outlay of $1,150,000. Application for sale of the property to the Missouri-Pacific Railway is pending, and decision by the Interstate Commerce Commission is expected by April 1. In the meantime passenger service is to be started prior to this date. Four modern interurban cars have been purchased to be put into service, and a schedule of fares based on 85 cents from Houston to Goose Creek, or commuters' tickets for 50 cents, has been announced. A modern electric locomotive capable of drawing 40 loaded cars has also been purchased for service on this line.

## Omaha Franchise Election Deferred

The question of granting a new franchise to the Omaha & Council Bluffs Street Railway will not be submitted at the May election in Omaha, Neb. The city attorney filed a number of objections to the draft prepared by the citizens' committee, mostly technical. As it was found impossible to secure an agreement in time to submit the franchise, it has been withdrawn by the citizens' committee, with the permission of the Council.

John Lee Webster, attorney for the company, has long held to the opinion that the company has a perpetual franchise, and he has announced his willingness to try the matter out in court. When the franchise asked by the company and defeated was submitted the company offered to waive the point if an extension were granted. The city voters refused this extension under the terms proposed. The Omaha *Bee* suggests that a judicial determination be secured. If the company has perpetual rights, the Council should know it, and if it has not, "then it cannot weigh them against other concessions in seeking a franchise."

The Guaranty Trust Company, New York, representing the bondholders, recently filed suit in the federal court setting up the claim of a perpetual franchise. Mr. Webster said he would press for an early hearing.

## No Segregation for the Present in Albany Case

The Public Service Commission has denied the motion of the city of Albany for an immediate ruling on the question of segregating the Albany zone from the Troy zone when the commission begins the consideration of the application of the United Traction Company for a fare increase. The commission recommended, however, that the communities affected by this application set forth their reasons for or against segregation in the briefs which they will present.

In denying the motion of the city of Albany, the commission stated that the question presented is one which should properly be determined in deciding finally upon the merits of the application made by the railway, and that to decide the question at this time would constitute a prejudgment on the part of the commission of one of the most important questions that will arise in determination of the case.

Chairman Prendergast of the commission announced on March 7 that briefs by the United Traction Company and the various municipalities are to be filed on or before April 1 in the matter of the railway's petition.

## Terminal Talk Revived in Watertown

Comparatively little headway has been made to date with the proposal recently presented to the City Council by the Milwaukee Electric Railway & Light Company providing for the expenditure of approximately $100,000 in Watertown for the erection of a modern terminal and train building and the removal of its railway tracks on three streets and part of another. The obstacle which seems to be blocking progress in this improvement program centers around the city's request to have the company share in the cost of the new West Main Street bridge which the city and interurban use to replace the present structure.

In testifying before the Council, Vice-President Jackson of the company said the company did not intend to substitute buses. He suggested that if local conditions required bus service the city should supply it by means of a local operator.

A petition was brought to the attention of the Council signed by 370 people urging that the tracks remain, while 107 persons urge that the tracks be taken up.

Questioned concerning the new terminal, Mr. Jackson declared train buildings would be erected adjacent to the station to permit three interurban cars to load and unload passengers under the roof. All company buses would also use the terminal facilities.

## The Story of Baltimore in 1926

Looking back over 1926, the United Railways & Electric Company, Baltimore, Md., has picked some of the things from the routine which it has embodied in a public statement that has been issued. The company says that although the items listed do not present an adequate picture of the task that was faced they suggest the size of the job. The following items are listed:

More than 15 miles of track was entirely reconstructed in 1926, at a cost of about $858,863.

One hundred street cars a month went through the company's paint shop for complete repainting, inside and out.

Twelve new articulated cars were built and put into service, making 34 in all.

10,111,945 more "seat-miles" were furnished. A "seat-mile" is a measure of service—one seat going 1 mile. Or put it this way: street car passengers had seats for 10,111,945 more miles last year than in 1925, which means they had 1,637,173,845 seat-miles, or almost as many seat-miles as Henry Ford has dollars.

225,255,633 revenue passengers were carried, or 1,020,106 more than in 1925.

Of the company's gross revenues of $16,715,709, $10,782,619 went right back into the expense of running the cars.

$1,954,671 more went back into the public treasury in taxes. This was 2½ times as much as the stockholders got, which was $818,000.

802,063 more transfer passengers were carried than in 1925.

Of the taxes paid out of carfares, $1,121,000 was park tax for the support of the city's parks.

2,008 public reports and criticisms of service were handled and adjusted as nearly as possible to the satisfaction of the critics.

# News Notes

**Agreement Made with St. Louis Union.**—Mayor Victor J. Miller of St. Louis, Mo., has announced an agreement with the St. Louis street car men's union whereby terms of the service-at-cost franchise now pending before the St. Louis Board of Aldermen will recognize the right of the car workers to unionize and will also restrict the use of one-man cars by the railway. The understanding with Mayor Miller, it is believed, will cause William R. Schneider, attorney for the union and member of the State Legislature, to withdraw the bill he had introduced at Jefferson City for the repeal of the service-at-cost law. It will also result in the railway workers actively supporting the franchise measure when it is presented.

**Westchester to Ask State Aid.**—The Westchester County Board of Supervisors has voted to ask State Senators and Assemblymen from Westchester to support the proposed legislation which will refer the passenger and commuter traffic problem in New York City and suburban areas to the Port of New York Authority. A report will be made to the Legislature of New York State and of New Jersey. The recommendations will not carry any weight until approved by voters of these sections.

**Another Railway After Coffin Award.**—The Virginia Electric & Power Company, Richmond, Va., will be a competitor in the national contest for the 1927 Charles A. Coffin award. In seeking this honor the company will emphasize particularly more riders and more revenue; a friendly public fostered by a co-operative spirit; lower

costs and increased reliability of service; increased safety for riders; increased co-operation between the management and employees, and financial accomplishments by way of improved investment worth of securities.

**Fares Lowered.**—The Union Traction Company, Nashville, Tenn., has reduced the fare from Nashville to Gallatin, Tenn., from 92 cents to 75 cents for a single trip. A round-trip rate of $1.25 has been established.

**Would Establish Ten-Cent Rate.**—The New York State Railways, in a supplemental petition filed with the Public Service Commission, asks permission to establish a new rate of fare of 10 cents between Oneida and Kenwood, instead of the present 8-cent fare, without any reduced rate through the medium of tickets, but with the privilege of a round-trip fare of 15 cents. The petition originally filed asked that the railway be permitted in the city of Oneida to sell three tickets for 25 cents with a cash fare of 10 cents, in place of the present 7-cent fare. A hearing will follow.

**Reports for Traffic Study.**—Norman D. Wilson, of Wilson, Bunnell & Borgstrom, consulting engineers, Toronto, Ont., is again in Brazil, South America, for the Brazilian Traction, Light & Power Company, Ltd., which controls the traction services in Rio de Janeiro and São Paulo. In 1925 Mr. Wilson reported to the company on the transit and traffic situations in these two cities. It is in connection with his recommendations for a revised franchise and the construction by the city of a short section of surface subway to relieve the traffic difficulties in the Triangle in São Paulo that that city has retained James Dalrymple, former general manager of the Glasgow Tramways.

**Tokens for Change.**—The use of metal disks or tokens, for change only, has been revived on the Rochester lines of the New York State Railways. The tokens will end the difficulties in making change for passengers and conductors alike. If the passenger has the correct fare, 8 cents, no token will be required. The disks are for use only when the passenger has not the correct fare and he is given a token in lieu of change. The new order does not affect the sale of tickets.

**Plan Three-Mile Extension of Service.**—Extension of through railway service of the Chicago Surface Lines, Chicago, Ill., for a distance of about 3 miles along Ewing Avenue and Indianapolis Boulevard in South Chicago was ordered on Feb. 16 by the Illinois Commerce Commission. Under present arrangements Chicago Surface Lines cars operate from the downtown Loop district over Cottage Grove and South Chicago Avenues as far as 93d Street only. This extension will give residents of South Chicago a more frequent and more direct service without transfer to downtown Chicago. Except for a new wye at the proposed terminus, no new track will be constructed in connection with the extension of service. Surface Lines cars will be operated over the present tracks of the Hammond, Whiting & East Chicago line, an affiliated company.

# Recent Bus Developments

## Interstate Service a Subterfuge in This Case

A recent order by the Public Service Commission of Pennsylvania denied the contention of the Highway Motor Coach Company that it does not need a certificate of public convenience from the commission to operate between Harrisburg and other cities and Camden, N. J., because it is doing an interstate business. The commission directed that the company cease operation until it has obtained a certificate.

The Highway Motor Coach Company is a Delaware corporation. Last year it began to carry passengers between Harrisburg and Philadelphia by way of Lebanon, Reading, Pottstown, Norristown, Roxborough, Philadelphia, Camden, thence back to Philadelphia. A month later the company began a similar service between York and Philadelphia. The commission said:

> The extension of the route a short distance in Camden, N. J., is a mere subterfuge or scheme to evade the law. The substance of a transaction is regarded by the law as essential and not the form of the transaction. Attempts made to evade the operation of one law by subterfuge have always been swept aside by courts and commissions. This principle is so well established as to need no citation. The transportation furnished by the respondent under the facts in this case is not interstate within the purview of the decisions of the United States Supreme Court.

## Interurban Becomes Iowa's Biggest Bus Operator

The Fort Dodge, Des Moines & Southern Transportation Company, Boone, Iowa, has purchased the Hawkeye Stages, Inc., with headquarters at Des Moines, making the Boone company, which is an auxiliary of the Fort Dodge, Des Moines & Southern Railroad, the largest single bus company of its kind in the State. The Boone company will have 444 miles of additional bus lines and will be operating 30 buses in Iowa more than 125,000 miles each month. C. H. Crooks is president, M. Johnston secretary-treasurer and G. E. Motz manager for the consolidated company. Among the lines will be a continuous one from Oskaloosa to Spencer.

## Experiments with New Fageol Twin Coach in Chicago

Trial operation of a new type of motor coach over Diversey Boulevard, Chicago, between Crawford and Laramie Avenues on Feb. 28 was interpreted by residents of that part of the city as an indication that the Chicago Surface Lines is to start motor coach service soon in conjunction with its railway operations. Permission to operate the Diversey Boulevard bus route was granted to the company last November by the Illinois Commerce Commission. The Surface Lines still have 90 days in which to start service.

The new bus, which made the test run over the proposed route last week, was designed and built by the Fageol Twin Coach Company and is being taken on a transcontinental demonstration tour by Frank Fageol, president of the company. It was described and illustrated in the ELECTRIC RAILWAY JOURNAL for Feb. 26, page 381.

Operation of the Diversey Boulevard route and other motor coach lines as extensions to the present railway system is being opposed by the Chicago Motor Coach Company, which has an appeal pending from the order of the commission authorizing the installation of the buses. It is understood, however, that residents along Diversey Boulevard have repeatedly requested the Chicago Surface Lines to provide this service.

## Ohio Court Frowns Upon Competitive Service

Bus lines in Ohio have lost a hard fight with the Pennsylvania Railroad in an effort to gain through service linking Columbus, Cincinnati and Cleveland. But according to the decision of the State Supreme Court bus transportation is a means of transportation auxiliary to the existing railway routes when such service is competitive and is not really needed. Nine cases were appealed from the Public Utilities Commission, and the higher court declared that neither the commission nor the bus companies running these shorter lines acted discreetly in transferring certificates of operation assigned to them to the Buckeye Company, which has vested power of the consolidated lines. The railroad charged the service company with "an intent deliberately to compete with their system to its prejudice." The transfers have thus been nullified and the cases referred back to the commission with the following interpretation of the law:

> An application to amend the tariff and schedule of one or each of two certified motor transportation routes, authorized to be separated as separate routes, so as to convert the service of such routes from local service between their respective terminals to a through service between the outside terminal of the two routes, is in effect an application for a new route, and must be made under Section 614-91, General Code, and publication must be made and notices served as provided in that section. And before an order can issue granting such service, the Public Utilities Commission must find that the public convenience and necessity require it.

Bills asking for more liberal treatment of operators who seek bus operating rights are still under consideration by the Ohio General Assembly.

## Suit Involving Purple Swan Dismissed

The suit of the Seiberling Rubber Company, Akron, Ohio, against the Purple Swan Safety Coach Lines, Inc., for rental due on tires used by the bus company was dismissed by Circuit Judge Moses M. Hartmann of St. Louis, Mo., on Feb. 28 upon the filing

of a stipulation by counsel that the dispute had been adjusted. Some of the Purple Swan lines were operated in competition with the Blue Goose line run by the East St. Louis & Suburban Railway. The stipulation indicates that the bus company paid $9,500 in cash and executed demand notes for $7,142 in favor of the Seiberling company in the settlement of the claim.

When the Seiberling company brought its action on Dec. 27, last, Judge Hartmann appointed a temporary receiver for the bus lines, but the receivership was terminated within three days when the Purple Swan Company filed a bond with the court to protect the plaintiff should the court determine that the coach lines owed the amounts claimed.

# Coach Losses Concern Cincinnati

## An Outline of President Draper's Proposal to the City Administration in Regard to Bus Losses—Railway Has No Monopoly of This Class of Service

IN A FORMAL report to E. D. Gilman, director of the Department of Public Utilities of the city of Cincinnati, Walter A. Draper, president of the Cincinnati Street Railway, has outlined a procedure for the reduction of losses on the operation of the motor coaches of his company. This operation has shown deficits averaging $14,000 each month over the nine months of its life. As losses have been absorbed in the profits of the street cars, a seemingly unfair situation exists.

The Cincinnati Street Railway does not have a monopoly in providing municipal transportation in Cincinnati. Independent bus lines have secured short routes through thickly populated sections of the city already served by railway lines. On the other hand, the railway, which was delayed in entering the motor coach field by extended franchise negotiations, operates the runs to remote suburbs and the crosstown lines. In several instances the railway established routes where independent lines had failed.

Of the three classes of motor coach service rendered by the railway, namely, lines radiating from the center of the city, crosstown lines and feeder lines, the first comes nearest to paying its way, while there is less real need for it than the two other classes of service.

Mr. Draper answers the question, Why the motor coach operation of his company loses money when independent companies apparently make a profit, as follows:

It can easily be seen that if independent lines do make a profit it is because, being free to choose at the beginning, the operators of these lines selected routes where the business would pay best. These routes were mainly along existing lines of travel and were and are reasonably short routes. Having the street cars at hand to take care of the rush-hour riding morning and evening, the independents have to provide very little if any additional service, and it is this rush-hour service, requiring investment and the maintenance of equipment which is used for so short a time, that is the most costly to give. The independent lines, moreover, do not issue transfers.

The motor coach lines of the railway were put on where service was needed or where it was thought motor coaches could supply a different class of service. Those of our lines that follow the same routes as street cars are, with one exception, long lines that run express service designed to accommodate the long rider, which again is the more costly service. The other lines either connect parts of the city and other intersecting car and coach lines or supply remote sections with a form of feeder service.

The next logical question, Why not discontinue the service, is answered by Mr. Draper:

The answer to this question is found largely in the answer to the other question, that the major parts of the service given by this company was put on because it was hoped it might serve a useful purpose and the same thing that makes some of it lose money; that is, remoteness of territory served, is in itself the reason why the service is needed. Giving a service that is not duplicative or competitive, these lines, therefore, should not be discontinued merely because they lose money. It is the measure of the loss that should govern. This principle has been recognized as sound by state law, which provides that service shall be extended or continued by a public utility even though it be given at a loss, providing this loss is not great enough to affect the results of the entire operation of the utility to the extent that there will not be a reasonable return on the investment and that there will not be an impairment of the service as a whole. The test of profitableness alone should not be applied to determine whether the service on the two cross-town lines of the company or the Mount Airy (feeder) line should be discontinued. The test of individual profitableness, if applied to some of the existing rail lines, would require their discontinuance, manifestly an absurdity. The Mount Airy line gives service to a part of Cincinnati that has no other public transportation facilities. It was begun at the request of the city after the independent operator had found it unprofitable and discontinued operations, but the loss from this line is not so great but that the system as a whole can afford to carry it.

It certainly must be clear that there is something fundamentally wrong if independent operators can select the profitable routes and this company must operate the unprofitable routes, with the consequence that the rest of the system must stand the losses. The only conclusion is that unified operation is the logical and economical basis for a city-wide public transportation system.

Mr. Draper's remedies do not include discontinuance of any lines at this time. The changes he suggests are:

1. Bring the fare limit on two of the routes which run from the city to distant suburbs closer to the city, charging 10 cents to the nearest point and 5 cents additional to any point beyond. Also reduce fare on outer end of these routes to attract riding for short distances in the outer zone.
2. Change the route of one line, running it through a more thickly populated section.
3. Discontinue express service except during rush hours on one other poor paying route so that a full load may be assured. This gives the opportunity of picking up passengers all the way into the city.
4. If these first three steps do not lessen losses sufficiently after a reasonable trial, alter the transfer privilege; either charge 5 cents for transfers except to cross-town lines, or eliminate them entirely.
5. Reduce the amount charged to depreciation after the end of the first year.

Mr. Draper concludes that after trying these measures there would still be left the expedient of increasing all motor coach fares. His idea is that if after the experiment were made that has been outlined such a step were found necessary, the traveling public could certainly find no fault with such a move and it would be in line with the tendency observed in other cities toward a higher class or de luxe service on the motor coach, with a corresponding higher rate of fare. Further Mr. Draper said:

Finally, in case it is found necessary, consideration should be given to the discontinuance of the poorest paying line or lines. While I would regret the necessity of discontinuing any line, it might have to be done in fairness to the rest of the system, and the motor coaches now operating on such discontinued line or lines could better be used for additional service elsewhere, especially on the two cross-town lines during the morning and evening rush hours.

I am aware that the trial of these various steps will consume time, but I am not yet willing to say that motor coach service in Cincinnati has cost the transportation system as a whole so much as to cause us to become panicky or to be driven to hasty action. It is true that the motor coach is not as popular, at least in Cincinnati, as it once was, and the necessity of protecting the existing rail car system for the great mass of people is apparent, but there is a place in a unified transportation system for all forms of transportation that can demonstrate their lasting qualities. Being charged with the responsibility and obligation of providing such a unified system, we cannot neglect to adopt any reasonable form of transportation that the public desires and is willing to pay for.

**Bus Experiment in Residential District.**—Further expansion of the bus system of the Rochester, N. Y., lines of the New York State Railways was marked March 7 with the opening of service on an experimental line in Ridgeway Avenue, residential north side section. Railway Commissioner Charles R. Barnes announced the buses would operate only during the rush hours until the traffic showed that patronage would be sufficient to warrant full time service. The service was installed on the appeal of residents.

**Hearing on Proposed Specifications Applying to Buses.**—The street transportation department of the Board of Public Utility Commissioners of New Jersey has submitted to the board proposed specifications applying to buses of the "city type, single-deck" and "parlor car type," which it is recommended shall take the place of the specifications adopted by the board on Dec. 29, 1924. The board will hold a hearing on the matter in Newark, N. J., on March 23, 1927, upon the question whether the specifications so submitted shall be adopted and fixed as just and reasonable regulations to be observed and followed by the operators of buses of these types.

**Milwaukee Railway Opposes New Operators.**—Competition between the Milwaukee Electric Railway & Light Company and the American Coach lines for business on the North Milwaukee and the Wauwatosa routes and the intercity route to Green Bay advanced a step when the American line announced that fares would be reduced ranging from 16⅔ per cent on city and suburban lines and 20 per cent on intercity routes. Metal tokens will be introduced so that passengers on the North Milwaukee and the Wauwatosa routes can purchase twelve 10-cent tokens, eight 15-cent tokens and six 20-cent tokens for $1. This makes a reduction of 16⅔ per cent on these fares when tokens are used. On the route between Green Bay and Milwaukee the revised fare will hereafter be $3.50 instead of $4.25. Fares to intermediate points will be similarly reduced. The Milwaukee Electric Railway & Light Company complained on the ground that this area was adequately served by its own facilities.

# Financial and Corporate

## Receivership Action Likely for Auburn & Syracuse Railroad

Receivership proceedings are anticipated in the case of the Auburn & Syracuse Electric Railroad, Syracuse, N. Y., which operates in Syracuse and also a suburban line connecting Auburn and Syracuse. A statement by the company said:

Having defaulted interest due April 1 and Oct. 1, 1926, a bondholders' protective committee was formed. Within a short time the Equitable Trust Company, New York City, which is trustee under the mortgage, will probably seek foreclosure. The natural conclusion of that will be the asking for the appointment of a receiver. Figures show the continual loss to be almost entirely due to use of privately owned automobiles.

The outstanding mortgage bonds of the company amount to $1,752,000 with annual interest charges of $87,600. The losses increased from $16,031.71 in 1924 to $87,684.34 in 1926.

## Increase in Passengers Carried in Winnipeg

The Winnipeg Electric Company, Winnipeg, Man., carried 57,985,144 revenue passengers in 1926. This represented a 5 per cent increase over 1925. The year 1920 established a record for the company and each succeeding year up to 1925 showed a decrease from the preceding year. The following table shows the trend:

| | |
|---|---|
| 1920 | 65,248,840 |
| 1921 | 61,515,325 |
| 1922 | 60,399,419 |
| 1923 | 58,253,356 |
| 1924 | 55,077,901 |
| 1925 | 55,096,058 |
| 1926 | 57,985,144 |

## Texas Tax Relief Bill Before Governor for Signature

Repeal of the gross receipts tax on interurbans and other electric railways in Texas was put up to the Governor on March 2 when the Senate finally passed the Kemble House bill. Senator Witt of McLennan, sponsoring the measure, declared that the Texas Electric Railway had not paid dividends on preferred stock in twelve months, despite the fact that it is the second largest taxpayer in McLennan County. He urged that repealing the gross receipts tax would leave the school, road and other taxes and place the electric railways on the same plane with other industries.

## Engineers Public Service Reports Good Year

Large increases in consolidated gross and net earnings are shown by the Engineers Public Service Company, New York, N. Y., in its annual report for 1926, issued recently to stockholders. Gross earnings were $26,627,687, an increase of $3,518,750 over the previous year, and the balance available for reserves and the 778,938 outstanding shares of Engineers common stock increased 25.9 per cent to $3,183,879. The report gives several detail analyses, including capitalization totaling $4.92 per $1 of gross, maintenance expenditures amounting to 9 per cent of gross and reserves and surplus equaling 72 per cent of annual gross earnings. The company reports, in addition to the acquisition of the Baton Rouge Electric Company, net increases in plant of its subsidiaries totaling $15,077,000 and the reinvestment of $3,391,455 of earnings in the properties.

The Engineers Public Service Company controls subsidiaries operated under executive management of Stone & Webster. The subsidiaries serve a population of 1,176,100. The increased earnings of the El Paso, Savannah and Key West properties reflect the healthy growth of industry in the territories served. The total number of stockholders is 8,800, an increase of 35 per cent in the last ten months.

# Cincinnati Has Good Year

### Substantial Increase in Passengers Handled—Progress Made in Rehabilitation of Property—President Draper's Remarks Abstracted at Length

TAKING everything into consideration, the results of the first year's operation of the Cincinnati Street Railway, Cincinnati, Ohio, since that company resumed control on Nov. 1, 1925, are not disappointing. This was the substance of the opening remarks of Walter A. Draper, president, at the recent annual meeting of the stockholders. He said the year had been one of readjustment and rehabilitation after the several years of negotiations between the city and the companies, during which time it was impossible for the then operating company to do many of the things desirable and needful in the interest of the public and stockholders. The budget filed with the city of Cincinnati on Dec. 1, 1925, covering estimated results of operations for the year 1926, indicated a deficiency for the year of $72,848, without including any estimate for the operation of the motor coaches, which were at that time not a part of the company's business. The actual results for the year 1926 show a surplus of $14,064 above all requirements, including dividends on stock and interest on notes, despite losses from motor coaches, and despite the much larger operating charge for track reconstruction than was anticipated when the budget was filed.

The essential feature of the present operating plan is that if the revenues are sufficient to pay all requirements, including operating costs, taxes and return on capital, and still produce a balance the city has the right, through its control of operations, to determine how this balance shall be applied, namely, to bring the property to an improved operating condition, to increase the service or to add to the fare control fund, so as to bring about a reduction in the rate of fare when that fund is increased from the initial amount of $400,000 to $600,000. Similarly, if necessary expenditures for maintenance, operation, taxes and return on capital exceed the revenues, the deficit must be made good out of the fare control fund until it is reduced to $200,000, when fares automatically increase. Into this fare control fund balances were paid from each month's operation for the period from Nov. 1, 1925, to Dec. 31, 1926, with the exception of July and August, when payments out of the fund were required to be made to meet deficits. The net amount added to the fund was $6,774 for the last two months of 1925, and $14,064 for the twelve months of 1926, or a total of $20,837.

Mr. Draper said that in comparing the results of operation for the year 1926 with the preceding year it was necessary to have in mind that a 10-cent fare was in effect on cars for the first ten months of 1925, as against the 8½-cent ticket rate and 10-cent cash rate in effect for the last two months

EARNINGS OF CINCINNATI STREET RAILWAY

| | 1926 | Jan. 1–Oct. 31, 1925 | Nov. 1–Dec. 31, 1925 | Total Year 1925 |
|---|---|---|---|---|
| Railway operating revenue | $8,102,517 | $7,558,322 | $1,242,269 | $8,800,592 |
| Railway operating expenses | 5,846,221 | 4,469,590 | 847,858 | 5,317,448 |
| Net operating revenue | $2,256,295 | $3,088,732 | $394,411 | $3,483,143 |
| Taxes assignable to railway operations | 708,831 | 625,290 | 123,369 | 748,660 |
| Gross income | $1,547,463 | $2,463,441 | $271,042 | $2,734,483 |
| Rentals | 25,150 | 1,030,232 | 16,675 | 1,046,908 |
| Balance | $1,522,313 | $1,433,208 | $254,366 | $1,687,575 |
| Interest and sinking fund on bonds and notes | 332,885 | 585,305 | 58,941 | 644,246 |
| Surplus | $1,189,428 | $847,903 | $195,425 | $1,043,329 |
| Deficiencies from 1924 allowed to be earned and paid | ..... | 521,905 | ..... | 521,905 |
| Balance | $1,189,428 | $325,997 | $195,425 | $521,423 |
| Allowance for return on capital | 1,175,364 | 347,043 | 188,652 | 535,695 |
| Balance | $14,064 | *$21,045 | $6,773 | *$14,272 |
| Franchise tax | ..... | 296,989 | ..... | 296,989 |
| Deficiency or surplus | $14,064 | *$318,034 | $6,773 | *$311,261 |

*Denotes deficiencies.

of 1925 and the twelve months of 1926; that motor coach operation began in April, 1926, chiefly on a 10-cent fare, and that the different corporate and financial set-up in effect up to Nov. 1, 1925, required larger rentals, interest, sinking fund and return on capital. Instead of the large rental figure of 1925, which this company received from the lessee at the rate of 6 per cent on its stock, there was the return on capital in 1926 at the rate of 5 per cent, and the smaller rental that was paid for the first three months of 1926 to the former Cincinnati & Hamilton Traction Company. The large balance for the twelve months of 1925 was required and was available for the payment of past deficiencies created in previous years when the receipts from fares were not sufficient to meet requirements, including the former city franchise tax.

RECORD OF PASSENGERS CARRIED IN CINCINNATI

| | 1926 | 1925 | 1924 | 1923 | 1922 | 1921 |
|---|---|---|---|---|---|---|
| Revenue Passengers: | | | | | | |
| Cars | 89,493,159 | 90,629,875 | 100,839,343 | 108,625,599 | 107,528,666 | 106,527,759 |
| Coaches | 4,104,586 | ..... | ..... | ..... | ..... | ..... |
| Total revenue passengers | 93,597,745 | 90,629,875 | 100,839,343 | 108,625,599 | 107,528,666 | 106,527,759 |
| Transfer Passengers: | | | | | | |
| Cars | 29,480,811 | 30,832,130 | 32,706,502 | 34,066,858 | 34,765,044 | 34,904,917 |
| Coaches | 768,711 | ..... | ..... | ..... | ..... | ..... |
| Free Passengers: | | | | | | |
| Cars | 1,465,831 | 1,309,845 | 1,319,318 | 1,292,290 | 1,399,018 | 1,527,297 |
| Total, all passengers | 125,313,068 | 122,771,850 | 134,865,163 | 143,984,747 | 143,692,728 | 142,959,973 |

The tendency toward a decrease in passengers carried on cars, which became quite marked in the spring of 1925 and was checked in the fall of that year, has now been overcome and, while the total number of passengers carried in 1926 was fewer than the total in 1925, the latter months of the year show a considerable increase over the similar month of the year preceding. This tendency toward an increase in passengers riding the cars is in the face of an increase in the number of automobiles in Cincinnati and the development of better roads.

On the subject of bus operation, he said that the company now had in daily service 62 motor coaches on ten lines. Four of these lines operated from outlying sections to the heart of the city, running chiefly express where paralleling car lines; two were crosstown lines, connecting up many radiating rail and motor coach lines, and three were feeder lines. He said that it was scarcely to be expected that they could be continued at as great a loss as had been experienced. As the rate of fare on motor coaches was fixed and not dependent upon their cost of operation, and as the deficit from their operation must be assumed by the railway, they thus contributed to the cost of carrying passengers on street cars, and it was possible that a continued or an increasing loss, he claimed, from operating motor coaches might eventually result in an increase in the fare on cars. On the other hand, he claimed, there should not be a too hasty condemnation of buses because the lines did not all show a profit. Some that were losing were rendering a service that parts of the city needed. He referred to the two crosstown motor coach lines rendering a distinct service for which rail service might otherwise be required at a greater cost to that particular territory than the present coach lines. He said that it was apparent that the public desired motor coach service not instead of but supplementary and in some cases in addition to rail lines. Independent motor coach operations which cut into the previous operating company's revenues so sharply during the year 1925 did not offer at this time the menace that they formerly did.

He answered the question of why motor coach service of the company was operated at a loss, while at least some of the independent lines claimed to show a profit by saying that the independents at the start, being unregulated, picked choice routes, generally short ones, in thickly settled sections and in most part on the same streets with existing rail lines where they were assured of loads. The routes operated by the company, he stated, include several to remote and thinly settled sections that no independent could be induced to serve. It was recognized, he said, that a unified and co-ordinated city transportation system was the most logical and satisfactory plan for serving the public. It was clear that if the profitable motor coach routes operated independently were a part of the whole transportation system they would tend to offset the loss from the needed but unprofitable lines.

The total amount expended for replacement and renewal of track and overhead construction in 1926, in addition to ordinary maintenance and repairs, was $523,367. Of this amount $451,994 was provided by the special depreciation reserve fund, $36,373 was paid for out of receipts and charged directly to operating expenses during the year and $35,000 was paid with funds borrowed for the purpose, which will be charged out and repaid at a later date. The purchase of new equipment had been deferred until the track over which it should operate could be put in better condition. Work had been done, however, on improving the condition of existing rolling stock and increasing the degree of comfort and convenience. Even a larger program for 1927 has been agreed upon after conferences with the chairman of the highways committee of Council and the city manager, amounting to nearly 140,000 ft., or approximately 26 miles of single track. Additions and betterments to the property of the company from Nov. 1, 1925, to Dec. 31, 1926, cost $970,299. Similar expenditures in 1927 will not exceed $2,000,000.

Mr. Draper referred to the rapid transit lines as a problem confronting the city as a whole; its ultimate disposition was the question. Surveys and studies already made clearly indicated that the line could not and should not be operated except as a part of a unified city-wide system. The immediate hope for the line lay in the possibility of its taking enough traffic on its rails to reduce the service required on the surface rails and to relieve traffic on congested streets to warrant its construction and operation. The future hope for the line lay in the fact that it would doubtless improve the value of the territory through which it ran, a large part of which had now been little developed.

He referred to the valuation of the property and the long-drawn out negotiations, which finally resulted in an agreement with the city fixing the capital value on Nov. 1, 1925, at $27,000,000, plus $1,000,000 for the Mill Creek Valley lines.

He said that the recognition of the mutuality of interests of the company and city, or of the car rider and the taxpayer, under the present plan of city control of the transportation system was clearly appreciated by the city administration and was evidenced by the co-operative efforts of city and company to facilitate this important work; the new year had been entered upon with confidence and a sincere effort was being made by the officials of the company to carry to the public of Cincinnati the message that the company was endeavoring to live up to its responsibility for providing public city transportation service of satisfactory character. According to him, it could be safely said without prejudice there were evidences of progress in Cincinnati that not only would be advantageous to all enterprises, but would also require the furnishing of increasing facilities by the company.

## Suburban Line Does Well

### Net Income of Chicago & West Towns Railway Has Practically Doubled Since 1920

The Chicago & West Towns Railway, Oak Park, Ill., has, during the last seven years, established its ability to show good earnings and has widened considerably the margin by which interest charges on its bonded indebtedness have been earned. Both gross earnings and the net income available for interest on funded debt have increased without exception in each year since 1920, the net having practically doubled in that time, rising from $177,331 in 1920 to $349,269 in the year just ended.

A comparison of the gross earnings, the net income and the bond interest charges for each year of the last seven follows:

| Yr. Ended Dec. 31 | Gross Earnings | Net Income Available Bond Int. | Bond Int. |
|---|---|---|---|
| 1926 | $1,441,083 | $349,269 | $105,000 |
| 1925 | 1,348,902 | 317,563 | 105,000 |
| 1924 | 1,273,702 | 287,546 | 91,961 |
| 1923 | 1,208,218 | 274,032 | 80,500 |
| 1922 | 1,132,427 | 242,683 | 69,250 |
| 1921 | 1,108,618 | 222,491 | 68,000 |
| 1920 | 1,000,096 | 177,331 | 62,333 |

Net income as available for bond interest is before provision for amortization of bonds or for depreciation.

Present interest charges on the funded debt have been covered on the average 2.55 times in the seven-year period from 1920 to 1926. In 1925

these charges were covered 3.02 times and in 1926, 3.33 times. The actual amounts paid as bond interest prior to 1924 are not significant in calculating the average number of times charges were earned, as from 1922 to 1924 the full amount of bonds now outstanding had not been sold, and prior to 1922 an issue with a lower rate of interest was in the hands of the public.

Capitalization of the Chicago & West Towns Railway consists of $1,500,000 of first mortgage 7 per cent bonds due on July 1, 1932; $1,000,000 of 6 per cent cumulative first preferred stock; $210,000 of 8 per cent cumulative second preferred, and $1,000,000 of common stock. The financial strength of the company is further indicated by the fact that dividends have been regularly paid on both issues of the preferred stock since its issuance. Dividends have been paid on the common stock at the rate of 6 per cent per annum since Jan. 1, 1926.

The first 7s of 1932 are a direct first and only mortgage on the entire property of the company. Additional bonds may be issued to the extent of 75 per cent of the cost of new construction, if earnings for the twelve preceding months have been equal to twice the interest requirements on the total bonds issued and to be issued.

The Dec. 31, 1926, balance sheet showed a property account totaling $4,528,340, compared with $4,347,447 at the 1925 year end, the fixed assets at the close of 1926 being equal to slightly more than $3,000 for each $1,000 bond outstanding. Against the property account there is a depreciation reserve of $672,160, additions to this reserve averaging about $60,000 annually. Working capital position at the 1926 year end was not particularly favorable, current assets totaling $106,309 with current liabilities, which included the reserve for taxes of $67,681, amounting to $124,772. Weakening of the working capital position during the year is accounted for by additions to the property account. The company is entitled to issue bonds to reimburse its treasury for the expenditures to property account. The amount that may be issued under the terms of the trust deed for these expenditures as of Dec. 31, 1926, is $350,000.

The Chicago & West Towns Railway serves a suburban territory lying directly to the west and southwest of Chicago which has experienced a particularly rapid growth during the last five years. A total of 73 miles of electric railway lines are operated in the villages of Oak Park, River Forest, Maywood, Cicero, La Grange, Forest Park, Lyons, Berwyn, Proviso, Riverside, Clyde, Hawthorne and others. The greater part of the power requirements are purchased from the Sanitary District of Chicago, two generating stations being maintained, however, as standby stations. Franchises in the communities served are of varying lengths, and with one exception, i.e. the village of Forest Park, franchises extend beyond the maturity date of the bonds.

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**Would Sell Railway.**—Mayor William E. Westbrook of Ogdensburg, N. Y., has announced that he will sell the rolling stock and property of the Ogdenburg Street Railway at public auction because of delinquent payments on paving assessments. The company has made no formal announcement of its plans except for a statement declaring it has until 1935 to pay the assessments under the law. It is understood, however, that steps will be taken to prevent the sale.

**Dividend Payment Reduced by Twin City.**—Directors of the Twin Cities Rapid Transit, Minneapolis, Minn., have declared a quarterly dividend of $1 per share on the common stock, payable April 1 to holders of record March 15. In 1926 the company paid four quarterly dividends, each of 1¼ per cent.

**New Board Member Elected.**—At the annual meeting of the directors of the Columbus Railway, Power & Light Company, held in Columbus, Ohio, recently, John S. Brookes was elected to the board. He replaces John Kelly of Columbus.

**Denver Tramway Reduces Debt.**—The funded debt of the Denver Tramway, Denver, Col., is to be reduced through refinancing. The first mortgage 6 per cent gold bonds and the first mortgage improvement 6 per cent gold bonds, due on April 1, totaling $2,598,000, will be acquired by the company from the holders, and are to be extended to Oct. 1, 1933. The bonds are to be deposited as collateral for a new issue of $1,750,000 Denver Tramway 6 per cent first underlying mortgage collateral trust sinking fund gold notes, maturing on Oct. 1, 1933.

**Interurban May Discontinue.**—Officials of the Pennsylvania-Ohio Electric Company are considering plans to terminate interurban railway service between Niles and Mineral Ridge, near Youngstown, Ohio. The company has continued service for some time at a loss, but officials consider it an imposition to be asked to share the cost of a new bridge in Niles over which the lines must run. R. N. Graham, manager of railways, so declared at a conference with Councilmen at Niles. Residents at Mineral Ridge say this is the only way hundreds of workingmen have of reaching their places of business.

**Denies Abandonment Approval.**—The Public Service Commission on March 8 denied the application of the Hudson Valley Railway, Glens Falls, N. Y., to abandon its lines between Lake George and Warrensburg and between Thomson and Greenwich. The commission in its summation of the case said the petitioner had not made a clear and satisfactory argument as to its financial inability to carry on successfully the operation of the Greenwich branch and that there existed a real public demand for the continuation of that branch. Also that there was a public need for the service in Warrensburg and that the Lake George-Warrensburg branch financial loss was not satisfactorily proved.

**Acquisition Offsets Loss from Abandonment.**—The Illinois Northern Utilities Company for the year ended Dec. 31, 1926, reports a net income of $828,739 after interest, amortization, taxes, retirement reserves and all other charges, equal after dividends on the preferred and junior preferred stock to $12 a share on $4,535,000 of common stock. This compares with a net income of $655,731, or $8.41 a share, on $4,885,000 common stock in 1925. During the year recently ended the company reacquired $700,000 of its common stock from the Middle West Utilities Company to offset the property loss resulting from the abandonment of the Sterling, Dixon & Eastern Railway. This enabled the company to take out of its fixed capital account the investment carried in the Sterling, Dixon & Eastern property, according to Martin J. Insull, president. The company had 4,458 stockholders at the end of 1926.

**Two New Directors Elected.**—George G. Shaw and P. H. Worman were elected directors of the City Railway, Dayton, Ohio, at the meeting of the stockholders on Feb. 10.

**Carhouse Property Sold.**—The carhouse property of the Alabama Traction Company at Decatur, Ala., has been acquired by the Cooper-Wells Company, operating the hoisery mill. The property lies adjacent to the hosiery mill and provides ample space for whatever expansion may be necessary in the future. The property was first acquired by the city of Decatur, which, ratifying the action of the Albany Council, took it over in settlement of claims against the railway.

**Increase in Capital Value Asked in Youngstown.** — Request that capital value of the Youngstown Municipal Railway, Youngstown, Ohio, be increased $55,953 is pending in the City Council. The increase, according to Harry Engle, street railway commissioner, is for improvements installed at the Mahoning Avenue garage, where the company's city buses are housed and kept in running condition. Of this amount $25,679 is for the installation of five 20,500-gal. gasoline tanks and one 20,500-gal. oil tank. The rest, $30,273, was used to purchase and install modern machine shop equipment.

**Merger of Reorganized Roads Arranged.**—Announcement has been made of the merging of Ohio and Indiana corporations under the single title of the Fort Wayne, Van Wert & Lima Traction Company. Officers and members of the board of directors are: Henry C. Paul, president; Frank H. Cutshall, treasurer, and James W. Barrett, secretary, all of Fort Wayne, Ind.; J. C. Neff, Philadelphia, and D. P. Abercrombie, Boston. The merged company is the successor after reorganization of properties previously existing.

**Eight Parts of Line to Be Abandoned.**—The Public Service Commission approved declarations of abandonment by the Empire State Railroad Corporation of eight parts of its line in Oswego, N. Y. The city is planning to give consents for the operation of bus lines to provide transportation service in the city. Evidence showed a gradual decline in patronage of the Oswego line within the past five years, the losses in gross revenues after payment of operating expenses being, in 1926, $24,423, in 1925, $18,786, and in 1924, $10,628. It was further shown that after paying operating expenses, taxes and interest, the railroad had a deficit of $59,968 in 1926. Revenue passengers on the Oswego City lines declined from 1,223,368 in 1923 to 947,620 in 1926.

# Book Reviews

### Main Street and Wall Street

By William Z. Ripley, Boston, Mass.: Little, Brown & Company. 353 pages. Price $2.50.

Books are seldom what the blurbs on their jackets purport them to be. In this case, however, Professor Ripley has in some of his caustic comments quite lived up to the claim made for it that his book is a startling exposé of present-day financial methods. Of one entrancing picture drawn of the banker's function in industry he said:

"This busy 'organization capital' bee, 'with honeyed thigh,' in Milton's words, buzzes from one flowery situation to another, extracting the precious nectar of control and just incidentally powdering the public with the preferred pollen."

As for Professor Ripley, he appears to be no dispenser of pollen at all, either preferred or common. One of the things at which this gallant Knight who has essayed the task of self-appointed censor does tilt, is the issuance of no-par stock, which he says cuts the ground from under any attempt to correlate closely the amount of the investment and a stated par value for the securities. He does admit, however, that, like most things on earth, human beings particularly, no-par stock is not altogether bad. According to the penetrating professor, the issuance of securities in this form does embody a useful principle, just as to him Coca-Cola sounded refreshing until he delved into the company's financial structure. He is not apparently against all holding corporations. He says even the holding company may benefit from a proper amount of articulation, but that such company need not be a vaudeville contortionist for all that.

And so the comment runs through the more than 350 pages, made up among other things of reprints of his articles "Stop, Look and Listen!" and "More Light!—and Power Too," both of which were the subject of comment in the ELECTRIC RAILWAY JOURNAL at the time of their appearance in the *Atlantic Monthly*. The chapter "More Light—and Power Too" is directed at the light and power industry, but some of his strictures apply equally well to cases in the railway field. It should not be assumed that all he says is condemnatory. That is not the fact. The professor sees many things that, in his opinion, need correcting and many tendencies appear to him to be fraught with danger, but he also sees any number of practices that are worthy of emulation.

Some of the matters upon which he touches are the complicated holding company structures, the lack of uniformity in legislation covering incorporation, the disposition of some holding companies to venture into far-off fields, the possible abuse of banker control, the frailties of some customer-ownership plans, the iniquity of recent sales of some properties at prices that might be regarded as inordinate, the inadequacy of some depreciation reserves, and kindred subjects.

Many of the points the professor raises have been raised before, and nowhere more than in the industry itself are some of the problems receiving more careful attention. The matter of simplification of corporate structure is now before the industry as a burning issue. During the war many expedients were called into play in order to preserve the *status quo*, or to preserve it as nearly as possible. Now that this emergency has passed, voluntary readjustment and simplification of corporate structure are taking place on an extended scale. Even the professor is cognizant of this tendency, for he himself cites several instances of it.

As for customer ownership, all the evils are inherent in it which the professor names. Utilities are cognizant of them. The report of the public service securities committee of the Investment Bankers' Association presented at the annual convention, Oct. 11 to 15, 1926, shows the extent to which some of the other subjects mentioned by the professor are receiving the serious attention of the investment bankers. All this is not said with the idea of mitigating the criticisms contained in this chapter. No industry should be so squeamish about its doings as not to accept with good grace suggestions from a source so well informed.

In concluding his preface the professor pays his respects to a host of persons to whom he is indebted, and then says that the only possible reparation will be that, despite its manifest shortcomings, the volume shall stimulate discussion and inquiry. And then, apparently as an afterthought, this professor, who himself is a master of cajolery, mordant humor, invective, just plain foolery and much common sense, adds: "That it may bring forth fruit in due season is my most earnest wish." He has certainly lived to see that wish fulfilled, and to find himself the recipient of a considerable quantity of fruit, some of it overripe, if it wasn't actually putrid.

### Electric Power Stations

By L. W. W. Morrow, managing editor *Electrical World*. New York: McGraw-Hill Book Company. 326 pages. Price $4.

This work is a sound discussion of the fundamental principles of production, transmission and distribution of electrical energy on a large scale in an economical manner. The book covers such topics as plant sites and their layout, coal oil and gas—their use in electric power stations, steam, auxiliary energy supply, boiler room, turbines, electrical equipment and switching. Throughout the book emphasis is placed on principles underlying the selection of proper equipment for specific conditions and on the methods of utilizing this equipment to best advantage.

### Primer of Simplified Practices

By United States Department of Commerce.

Growing out of a concerted movement on the part of producers, distributors and consumers in co-operation with the Department of Commerce a primer of simplified practices in production has just been issued. The primary object of the book is to eliminate needless variety in sizes, dimensions and types of commonplace articles to the end that production cost may be decreased while the utility and efficiency of production are enhanced.

Higher returns to the worker, savings to the consumer, greater productivity, enlarged general purchasing power and more intelligent use of our natural resources, resulting in benefits to the entire nation, are cited as some of the advantages to be gained through simplified practice.

This simple and effective method of attacking waste differs from standardization in that it tends only to the elimination of odd sizes of products in small demand. It does not interfere with fashions or styles.

The co-operative trend of the times shows that there are many features in a large proportion of commonplace articles in which attempted individuality is superficial and useless, and stands in the way of their broader use. "For instance," the primer says, "twenty years ago there were 180 different sizes and styles of electric lamp bases. The common base which is used today has been a factor in increasing the use of electricity for lighting purposes, yet there are other features of the electric lamp which retain their individuality."

The history of the simplification movement is a record of constant abandonment of the fallacy that widely diverse or "odd sizes" tend to secure competitive advantages. The passing of this misconception had led to a point where today industries as a whole are very generally competing with other industries through simplification to broaden markets and induce the widest possible consumption of their products.

Under the procedure of the Division of Simplified Practice, each simplified practice recommendation must be accepted by producers, distributors and consumers representing 80 per cent of the annual volume of the industry, it being believed that only such a proportion of acceptance will insure general application and adoption. The division has no police power to enforce simplified practice recommendations nor does it desire any. The government offers its services merely as an effective agency in bringing together business groups on a neutral ground. The final recommendations as to the elimination of sizes, styles and types of articles is the job of the industry itself and the adherence to such recommendations is left entirely to the business group interested. A representative standing committee is appointed at the general conference to serve as a liaison between the Department of Commerce and the industry, and upon which devolves the duties of promoting and supporting findings of the conferees, as well as conducting annual resurveys to ascertain the degree of adherence and convene to effect revisions, or reaffirmations.

# Personal Items

## Changes on Interstate

**Advancement of Officials, Announced Recently, Has Gone Into Effect—Mr. Van Arsdel Succeeds Mr. Reid**

Important changes in the personnel of the Interstate Public Service Company, Indianapolis, Ind., were announced recently by Harry Reid at a dinner given at the Columbia Club in his behalf by his associates in the Indianapolis office of the company.

As stated previously in the ELECTRIC RAILWAY JOURNAL, Mr. Reid has been named president of the National Electric Power Company, New York City. He has been giving most of his time to his new position for some time and stated that at the annual meeting of the stockholders of the Interstate on March 7 the following changes in the personnel of the Interstate would be made:

E. Van Arsdel

E. Van Arsdel, who has been vice-president of the Interstate for eight years, will become president.

I. L. Oppenheimer, who has been with the Interstate for six years, as assistant to Vice-President Van Arsdel, will become vice-president in charge of the operation of the electric, gas and water properties.

L. M. Brown, who has been general manager of the railway of the Interstate between Indianapolis and Louisville for several years, will become vice-president in charge of all railway operations for the company.

W. Marshall Dale, who came to the Interstate about two years ago from the Kentucky Utilities Company, will become vice-president and treasurer in charge of the finances.

A. D. Jones will become vice-president and auditor in charge of the accounting and stores.

G. J. Oglebay, who has been manager of the Bedford district for several years, will become assistant to Vice-President Oppenheimer, in charge of the gas, electric light and water properties.

While the sentiment expressed at the dinner indicated much regret at Mr. Reid's departure from Indianapolis, it also was evident that his associates feel great pleasure in his elevation to the management of a property of such large scope as the National Electric Power Company, one of the large units of the Insull organization operating gas, electric, water and railway properties in twelve states. Mr. Reid has succeeded Albert Emanuel of New York as president of the National Electric Power Company, Samuel Insull succeeds Victor Emanuel as chairman of the company.

Mr. Reid went to the Interstate in January, 1917. He was elected president and general manager within a short time thereafter and under his direction the Interstate has grown, not only as one of the largest utilities in Indiana, but in the good graces and good will of the people in the many communities it serves.

Mr. Van Arsdel is well known and highly esteemed by the men and women with whom he has been associated in the company. He is a native of Kentucky and went to Indianapolis in March, 1917. He was operating manager of the Interstate for a year, following which he became its vice-president. He was vice-president of the Kentucky Utilities Company at the time of his appointment as a member of the Interstate organization. Mr. Van Arsdel was with Mr. Reid at Louisville for five years in the operation of the Kentucky Utilities Company properties.

At the dinner at which the changes in personnel were announced Mr. Van Arsdel, on behalf of the employees and executives in the Indianapolis office, presented to Mr. Reid a beautiful center piece of Kirk silver and two beautiful silver candlesticks of the same design. Mr. Reid's associates also presented to him a marble desk set inlaid with gold.

As for the other employees Mr. Rockefeller has been transferred from the Connersville district to the Bedford district as local manager. For the past three years he has been manager of the Connersville district and prior to this he was located at Aurora for a period of nine years in the same capacity.

Fifteen years service with one organization is Mr. Oglebay's record. During the past eight years he has been located at Bedford, Ind., in the capacity of local district manager. Effective on Feb. 1, he joined the Indianapolis organization as assistant in the operation of electric, gas and water utilities.

Mr. Large will succeed Mr. Rockefeller as district manager at Connersville, Ind. Prior to this transfer, he was district superintendent at Oakland City, Ind., and he has been associated with the Interstate for a period of three years.

## W. R. Power Heads Kentucky Association

W. R. Power, general manager of the Ohio Valley Electric Railway, Huntington, W. Va., was elected president of the Kentucky Association of Public Utilities at its meeting in Louisville on Feb. 18-19.

Early in his career Mr. Power went with the General Electric Company, Schenectady, in the testing department. In the fall of 1903 he joined the American Railways on the Chicago & Joliet Electric Railway property at Joliet, Ill. A year later he was transferred to one of its Pennsylvania properties and in 1912 was transferred to Huntington, W. Va., on another property of the same company. Five years later Mr. Power was made general manager of the Consolidated Light, Heat & Power Company and affiliated companies in that district, consisting of the railway and lighting companies at Ashland, Ky., and Ironton, Ohio. The holding company was taken over three years ago by the American Gas & Electric Company and is now known as the Appalachian Electric Power Company, Huntington district.

W. R. Power

It was with P. H. Chase, chief electrical engineer for the American Railways, that Mr. Power demonstrated in 1921 the possibility of inspecting high-tension lines by airplane. The demonstration was made in a new Curtis "Oriole" with Bob Shank, a local aviator at Huntington, as pilot. A distance of 25 miles and return was covered in the flight. The line inspected was being constructed by the Virginia Power Company from Cabin Creek, in Kanawha County, to Huntington. It was said in the April 9, 1921, issue of ELECTRIC RAILWAY JOURNAL that both Mr. Chase and Mr. Power had found the plan workable.

Mr. Power was reared in Kansas. His education included special courses at the University of Illinois.

## Glasgow Tramway Appointments

Following on the appointment of Lachlan McKinnon to be general manager of Glasgow Corporation Tramways, Glasgow, Scotland, in succession to James Dalrymple, retired, the tramways committee has approved the fol-

lowing recommendations submitted by the general manager: James N. Wilson, secretary and treasurer of the department, to be deputy general manager; Robert F. Smith, accountant, to be traffic superintendent; and G. W. Alexander, principal assistant to Mr. Smith, to be accountant for the railway department.

All of the officers so named have for many years been in the service of the corporation. Mr. Wilson will continue to hold the office of secretary and treasurer.

## North Shore Line Appoints New Officers

Reorganization of the transportation department and changes in divisional limits of the Chicago, North Shore & Milwaukee Railroad to facilitate train operation were made known recently with the announcement of ten new appointments by General Manager John F. Egolf. All of the new appointees are under the supervision of J. W. Simons, general superintendent of transportation.

Chester K. Thomas, director of service improvement, has been named division superintendent of the Main Line Division, in charge of all train operation between Harvard Street, Chicago, and Austin Avenue, Milwaukee, including the Mundelein-Lake Bluff service.

William Burke has been appointed superintendent of the Milwaukee Division, with supervision of all traffic operating between Austin Avenue and Sixth and Clybourn Streets, Milwaukee.

Charles Cawley and John J. Dee have been named superintendent and assistant superintendent, respectively, of the Chicago Division, between 61st Street and Harvard Street, in the city of Chicago.

George C. Kenry is appointed superintendent in charge of all train and motor coach operation in the city of Waukegan and on the Shore Line Division between North Chicago Junction and Waukegan.

George Bernard has been appointed conductor instructor.

D. A. Miner has been named motorman instructor with supervision over all divisions. In addition thereto he assumes the duties of trainmaster.

George Merriman, S. M. Carrell and William Ives are appointed trainmasters with supervision over train operation of the Chicago, North Shore & Milwaukee Railroad between Chicago and Milwaukee, and Lake Bluff and Mundelein.

**Jasper C. Johnson,** formerly superintendent of operations of the main line division of the Shore Line Motor Coach Company, has been appointed assistant general manager. Mr. Johnson's headquarters will be at Michigan City, Ind.

**F. M. Plake** of the valuation engineering force of the Missouri Public Service Commission has been named chief valuation engineer to succeed James L. Harrop, resigned. Mr. Plake has been with the commission for four years. Prior to that time he served with the Interstate Commerce Commission.

# Obituary

## Dudley Farrand

Dudley Farrand, identified with the electric light and power industry for many years and vice-president of the Public Service Corporation of New Jersey, died on March 3 at Fair Haven, N. J., in his 59th year. He started his career as a clerk with the Newark Electric Light & Power Company and after two years of service he was made assistant secretary. He was next made assistant manager and subsequently he was placed in charge of design and construction. After an association with the People's Light & Power Company, during which he was assistant general manager and general manager, he became general manager of the United Electric Company of New Jersey, and four years later he obtained a similar position with the electric department of the Public Service Corporation of New Jersey.

On the formation of the Public Service Electric Company in 1910 to take over all the electric properties of the Public Service Corporation Mr. Farrand was appointed its general manager. Five years later he was made its vice-president and general manager, assuming in addition the duties of assistant to the president in 1917. Mr. Farrand was president of the National Electric Light Association in 1907 and the following year was appointed by President Roosevelt as technical adviser representing the electrical interests to the National Conservation Commission.

## George J. Baldwin

George J. Baldwin died at the Johns Hopkins Hospital, Baltimore, Md., from pneumonia, on March 5. No truer eulogy can be written for this great organizer of public utilities throughout the South than to say he spent the major part of his 70 years in serving the interests of philanthropy and in helping to create power in industrial life. Mr. Baldwin, a partner in Stone & Webster since 1898, under which company these organizations were formed, had also been vice-president and general manager since 1916 of the American International Corporation, founded during that same year to extend and cement the foreign financial and commercial relations of the United States.

Upon graduating from the Massachusetts Institute of Technology in 1887, his activities increased and progressed first from chemist at the Woodstock Iron Company, Anniston, Ala., to superintendent of the Bradley Gold Mine Company of Nacoochee, Ga. He resigned from the mine company after a year of service to join the Baldwin Company, cotton factors and dealers in fertilizers. In 1886 he founded the Baldwin Fertilizer Company, of which he was president until 1894. As a member of the firm of Stone & Webster, with which he aligned himself four years later, he organized the following companies, being at one time or another president of all of them: Savannah Electric Company, Jacksonville Traction Company, Key West Electric Company and Pensacola Electric Company. Mr. Baldwin at one time also was first vice-president of the Pacific Mail Steamship Company and acted as chairman of the New York Shipbuilding Corporation.

## James W. Samuel

James W. Samuel, former assistant treasurer of the United Railways, St. Louis, Mo., died in his home in that city on Feb. 17, following a long period of ill health. He had been relieved of his duties as assistant secretary and treasurer of the company by Receiver Rollo Wells in 1920. At that time Mr. Samuel, 40 years old, had been in the employ of the railway for about 25 years. He started as a clerk and occupied in turn many important positions with the company. For many years he was chief clerk in the office of the treasurer and in 1916 was elected to the office of assistant treasurer and secretary.

In filling that position he supervised the counting and banking of all money taken in on the cars, issued and registered the capital stock of the company, collected bills and looked after the rental of buildings. He also kept records of all insurance policies of the company. At the age of 16 he served as general utility boy in the employ of the old Lindell Railway. This was in August, 1895. When the Lindell was consolidated with the other systems of St. Louis Mr. Adkins, former treasurer of the old Lindell lines, became secretary and treasurer of the United Railways. Mr. Samuel continued then in Mr. Adkins' office. Mr. Samuel was 48 years old.

**John Stopp,** for several years general shop foreman at the carhouse of the Tri-City Railway, Rock Island, Ill., died recently. He started service with the Tri-City property 35 years ago as a motorman. Mr. Stopp was 58 years old.

**Joe C. Thompson,** secretary and assistant treasurer of the Texas Power & Light Company, Dallas, Tex., died at Dallas on Feb. 28. Mr. Thompson was also tax commissioner for the Texas Power & Light Company, Dallas Power & Light Company, Dallas Railway & Terminal Company and the Texas Electric Railway, Inc. He had been connected with these companies since 1913 and had lived in Dallas for 25 years. Mr. Thompson was 52 years of age.

**John R. McGinley,** an organizer of the Philadelphia Company, of which he was vice-president and general manager for many years, died in New York City recently. Mr. McGinley, a prominent figure in the industrial world, was an early associate of George Westinghouse, with whom he formed the Westinghouse Electric & Manufacturing Company, and with whom he was associated for many years in the Westinghouse Air Brake Company. He was actively identified with many industrial and financial institutions of Pittsburgh and elsewhere, among them the Fidelity Title & Trust Company, the Duff Manufacturing Company, Chicago Pneumatic Tool Company, Union Switch & Signal Company and the R. D. Nuttall Company.

# Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

## Coffin Awards Made to General Electric Employees

Twenty-seven employees of the General Electric Company were awarded Charles A. Coffin Foundation certificates of merit for their outstanding services toward the increase of the company's efficiency or progress in the electrical art during 1926. The awards were made March 4. With each certificate went four shares of General Electric common stock. One-third of the twenty-seven awards were to workmen, two to foremen, eight to engineers, five to commercial men and three to administrative employees.

The Charles A. Coffin Foundation, which makes the awards, was created by the General Electric Company in 1922 in recognition of the services to the electrical industry of the late Charles A. Coffin, first president of the company, who died last summer. The awards of the foundation include, in addition to those to General Electric employees, yearly prizes in the electric railway and power fields and a number of annual fellowships in American universities.

## Work Begun on Twin City's New Noiseless Cars

Construction has begun in the St. Paul shops of the Twin City Rapid Transit Company, Minneapolis, Minn., of 25 noiseless cars provided for in the company's 1927 budget, which has been accepted by the Minneapolis City Council. These are to weigh 1,000 lb. more than the trial cars that have been in service two or more years, providing for more structural strength, but 10,000 lb. less than the standard car in use. The cars will cost $155,000, of which 60 per cent will be charged to the Minneapolis division and the rest to the St. Paul City Railway. Aluminum is utilized considerably in the structure of the cars. With the use of a new type of wheels and brakes and through other features the car noise is reduced to a minimum, from the viewpoint of modern engineering.

## Chicago, Aurora & Elgin Railroad to Build New Terminal

Plans for the construction of a new passenger terminal at Aurora, Ill., have been announced by the Chicago, Aurora & Elgin Railroad. Acquisition of a new right-of-way extending several blocks along the Fox River and of an entire business block at Broadway and New York Street has been completed by the company and construction of a $60,000 terminal station will be begun at once. Extension of the city's principal business district one block south along Broadway is expected to result from the railroad's undertaking.

In all, more than 10 acres of land has been purchased by the company and the total cost, including terminal construction, is said to be approximately $1,000,000. The new terminal and new right-of-way will make it possible for the Aurora-Elgin line to discharge passengers in the heart of Aurora without running its trains over the street car tracks of the Aurora, Elgin & Fox River Electric Company on Broadway as at present.

The Aurora terminal is part of a comprehensive plan of improvement started by the railroad since its purchase by Samuel Insull and associates early in 1926. A new $250,000 terminal is now under construction at Wells Street, Chicago, and extensive improvements are being made in the roadbed and rolling stock.

## Some Details of New Jersey Company's New Macks

Additional facts are available about the 77 Mack buses recently ordered from Mack Trucks, Inc., for use on the lines of the Public Service Transportation Company, Newark, N. J., and twenty by the Capitol District Transportation Company (United Traction Company), Albany, N. Y. Thirty-seven of the buses ordered by the Public Service Corporation are gas-electric drive, as are the twenty ordered by the Capitol District Company. Forty ordered by the Public Service are mechanical drive Macks. All buses are of the six-cylinder type as shown in the accompanying illustration. The Public Service Company also purchased at the same time 70 four-cylinder, gas-electric drive Macks, bringing the total order up to 147 buses.

The six-cylinder Macks are equipped with genuine leather-upholstered seats, and have a capacity of 29 passengers, sitting. The engine, radiator, gasoline tank, steering wheel, transmission and entire chassis are mounted on blocks of live rubber under compression. This system of rubber suspension is known as rubber shock insulation, as these rubber blocks damp out vibration so that an increase in bus life and passenger comfort is obtained.

In the gas-electric drive buses, an electric generator is connected with the gasoline engine, and then through a control box with an electric motor. Only one electric motor is used and this is connected directly to the standard Mack driveshaft. It is claimed that the single motor drive eliminates several hundred pounds weight,

Mack Six-Cylinder Gas-Electric Bus of the Type Ordered for Use in Newark, N. J., and Albany, N. Y.

extra maintenance and extra cost which must be calculated in gas-electric drive buses using two motors. Speed in the gas-electric drive bus is controlled by acceleration of the gasoline engine.

## Bertin Heads Galena Signal Oil

M. J. A. Bertin was recently elected president of the Galena Signal Oil Company, following his election as a director during the annual meeting of the company. Mr. Bertin succeeds L. G. Drake, who resigned as president and director. F. A. Burgess is another director elected at the annual meeting, succeeding C. W. Hochette. At a subsequent meeting of the directorate J. French Miller was named as treasurer, in place of William P. Westcott.

## Triplex Car Studied for Use in Montreal

It is understood that the order for the new cars and trailers for the Montreal Tramways, Montreal, Que., will not be placed until a decision on the desirability of the new type of triplex car has been ascertained.

For the present, according to the Montreal Tramways Commission, no more one-man cars are in prospect. The original 50 placed in operation were designed to give more adequate service on certain routes, and not with the idea that future equipment would be entirely of this model.

Inquiry has been made as to whether consideration has been given to double-deckers for Montreal. The matter has not been studied to the bottom, but the responsible operating officials at Montreal are said not to be much impressed with such a model for employment in a climate where, in winter, ventilation is of paramount importance.

As indicated in the ELECTRIC RAILWAY JOURNAL for Feb. 26, page 403, the order at Montreal is for 50 cars.

## The Westinghouse Advertising Policy

Much misunderstanding has developed over the recent newspaper stories concerning the announcement on the part of the Westinghouse Electric & Manufacturing Company to use daily newspaper advertising. Certain newspapers used the news story that was sent out in such a way as to make it appear that no other media might be used.

The Westinghouse company is giving up all general magazine advertising, feeling that it can handle institutional advertising and certain product advertising through concentration in localities as conditions demand. The newspaper space will not be used for highly technical apparatus, but primarily for apparatus that is sold through dealers and jobbers. For instance, it might run a campaign on street lighting in a certain city where it was known that thought is being given to a new street lighting system. It was felt that such a situation is primarily of local interest, and that in this, as in many phases of the company's general advertising, newspapers furnish a more effective medium than do general magazines.

An article in the March 10 issue of *Printers' Ink* by J. C. McQuiston, director of publicity of the Westinghouse company, clarifies the situation. In it he makes this statement: "The technical and trade press advertising in our opinion is absolutely as essential to our welfare in the future as it has been in the past."

## *Track and Line*

**Miami, Fla.**—Application was made recently for the extension of railway service to Cocoanut Grove by W. T. Price in behalf of the residents of the territory involved. The plan contemplates a spur line from the Coral Gables Rapid Transit route. The estimated cost was placed at approximately $166,000 for 3.4 miles of track.

**Connecticut Company**, through N. J. Scott, manager of the Hartford division, has announced plans for new track construction and changes on the Rockville, Hartford & Stafford Springs line. The track department will install a switch at the Burke Farm, Rockville, another at Tolland Avenue, and will replace the switch at Ogden's Corner. These improvements will permit cars to make the trip between Tolland Avenue, Rockville, and Hartford in about one hour and fifteen minutes.

## *Shops and Buildings*

**Department of Street Railways, Detroit, Mich.**, has a program under way which contemplates the sale of some of its carhouse property and the erection of buildings elsewhere. Legal objections having been overcome, the street railway commissioners have empowered the department of street railways to readvertise for bids on its property on Woodward Avenue across from the Highland Park plant at the Ford Motor Company. The property, no longer needed for carhouses, has a frontage of 125 ft. on Woodward Avenue and is 517 ft. deep. At the time it was previously offered for sale, a bid of $525,000 was received. The sale was halted when it was discovered that the charter requires a vote of the people to dispose of real estate involving more than 10 cents per capita of population. Since then the charter has been amended to read 30 cents. The City Council has voted to approve the expenditure by the department of street railways of $280,000 for 20 acres of land on Coolidge Highway near Grand River Avenue, as a carhouse site.

## Metal, Coal and Material Prices

| Metals—New York | Mar. 8, 1927 |
|---|---|
| Copper, electrolytic, cents per lb | 13.15 |
| Copper wire, cents per lb | 15.25 |
| Lead, cents per lb | 7.65 |
| Zinc, cents per lb | 7.10 |
| Tin, Straits, cents per lb | 70.00 |
| **Bituminous Coal, f.o.b. Mines** | |
| Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons | $4.35 |
| Somerset mine run, Boston, net tons | 1.975 |
| Pittsburgh mine run, Pittsburgh, net tons | 1.85 |
| Franklin, Ill., screenings, Chicago, net tons | 2.625 |
| Central, Ill., screenings, Chicago, net tons | 1.875 |
| Kansas screenings, Kansas City, net tons | 2.50 |
| **Materials** | |
| Rubber-covered wire, N. Y., No. 14, per 1,000 ft | $5.50 |
| Weatherproof wire base, N. Y., cents per lb. | 16.75 |
| Cement, Chicago net prices, without bags | 2.05 |
| Linseed oil (5-bbl. lots), N. Y., cents per lb. | 10.70 |
| White lead in oil (100-lb. keg), N. Y., cents per lb | 14.50 |
| Turpentine (bbl. lots), N. Y., per gal | $0.77 |

## *Trade Notes*

**John Alden Plimpton** was appointed Western manager of the Pennsylvania Crusher Company, Philadelphia, Pa., effective Feb. 1. Mr. Plimpton's office will be in Chicago. He succeeds B. S. Darling, who has undertaken association work. Mr. Plimpton is a graduate of the Massachusetts Institute of Technology, and prior to his promotion was sales engineer at the company's Pittsburgh office.

**Wiswell Improved Railroad Crossing Company, Chicago, Ill.**, reports the election of the following gentlemen as officers and directors of the company. The personnel was elected at the annual meeting held on Jan. 26. Officers: C. T. Wiswell, president; T. G. Murray, vice-president and chairman of board; C. P. Jaeger, secretary and treasurer; L. C. Larson, sales manager. Directors: T. G. Murray, president Association of Commerce and Merchants, Madison, Wis.; Charles O'Neill, vice-president Bank of Wisconsin, Madison, Wis.; H. V. Tennant, consulting engineer, Portage, Wis.; G. T. Wiswell, civil engineer, Chicago, Ill.; J. A. Lorimer, merchant, Chicago, Ill.; C. P. Jaeger, business man, Madison, Wis., and W. E. Hanson, construction engineer, Chicago, Ill.

## *New Advertising Literature*

**Chausse Oil Burner Company, Elkhart, Ind.**, is issuing catalog No. 11 descriptive of the Chausse portable asphalt plant and other equipment for repairing asphalt pavements. The catalog is well illustrated and in addition to covering details of the portable plant has information and cuts descriptive of the Chausse railway switch heater.

**Ohio Brass Company, Mansfield, Ohio**, has issued an attractive map of the United States which is after the general design of "Ye Olde" mariner's chart. Within the borders of each state is shown a cut or design of some product of the company that is of outstanding significance to the specific territory.

**Amtorg Trading Corporation** has just issued an elaborate commercial compendium of the United States, containing 1,076 pages with 2,800 illustrations. The "Catalog of American Industry and Trade," as it is styled, is printed in Russian and is especially designed to place American business before every business and trade executive in the Soviet union. Six hundred and forty-three pages of American advertising contain the insertions of 382 manufacturers of 30 states of the Union and of Canada. The catalog is handsomely bound and, in addition to presenting the claim and operations of the American industries, has interesting articles, contributed by noted engineers and business men. An economic survey of the United States is included.

# *In Scranton, Pa., also—*

Twelve new interurban, one-man, two-man type cars, to serve Scranton's mining district, recently delivered to the Scranton Railways are equipped with

# "Peacock" Staffless Brakes!

Reg. U. S. Pat. Off.

The Peacock Staffless

All of the new rolling stock of this Company, both city and interurban, are thus equipped!

They have many advantages which adapt them to modern cars—low installation and maintenance cost—three times the braking capacity of ordinary hand brakes—almost unlimited chain winding capacity—occupy little platform space—simplicity of operation, etc.

There are other reasons why "Peacock" Staffless Brakes are specified on nearly all modern cars. May we tell you about them?

## National Brake Company, Inc.

**890 Ellicott Square** **Buffalo, N. Y.**

*Canadian Representative:*
**Lyman Tube & Supply Co., Ltd., Montreal, Canada**

THESE advertisements will feature, from month to month, bus bodies of standard types and sizes which are the product of the exceptional experience and facilities of this company.

THE BAKER-RAULANG COMPANY
*Bus Body Division* Cleveland, Ohio

Baker Raulang Bus Bodies

# Pile on your miles!

**Long distance hauling is just what these tires are made for. Hard daily grinds mean nothing in their long life. They cushion your trucks under a staggering total tonnage—and give you a ton-mile cost that adds generously to your profits**

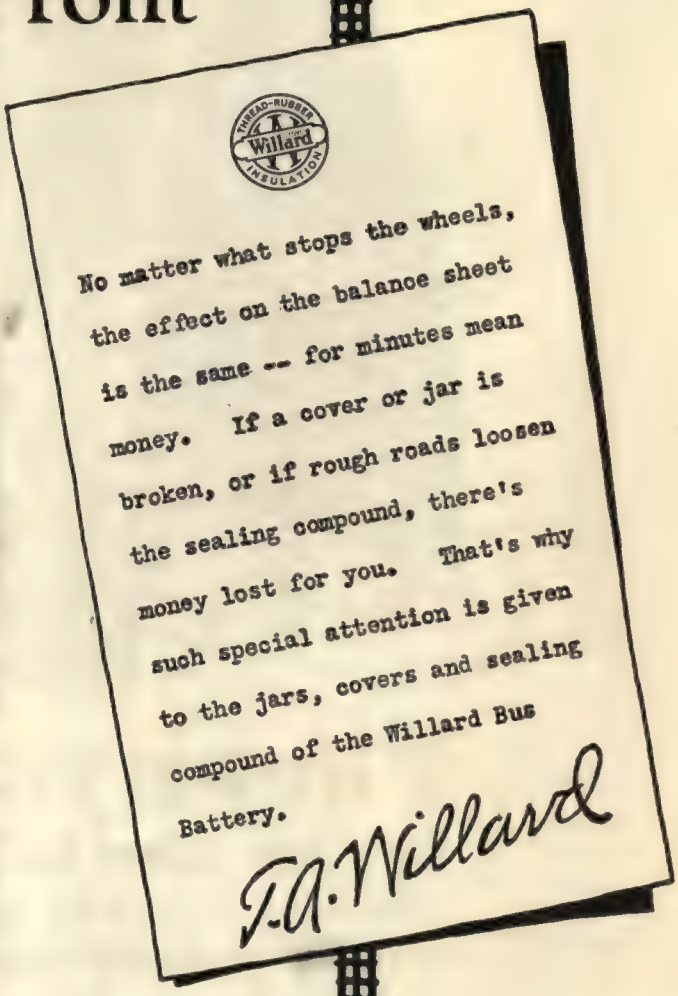
THE B. F. GOODRICH RUBBER COMPANY
AKRON, OHIO—*In Canada:* CANADIAN GOODRICH COMPANY, KITCHENER, ONTARIO

# Goodrich

## FOR TRUCK TIRES

# The More Mileage— The More Profit

Cross Section of Willard Bus Battery Cover




The covers and jars of the Willard Bus Battery are of the highest quality rubber—and each jar is sealed with a semi-soft compound which is not affected by strains and vibrations. Thus they protect you against service interruptions.

WILLARD STORAGE BATTERY COMPANY
CLEVELAND, OHIO

# Willard Batteries

# It can't rot

Through
**Asbestos**
and its allied products
INSULATION
BRAKE LININGS
ROOFINGS
PACKINGS
CEMENTS
FIRE PREVENTION PRODUCTS

## *because it's made of rock—*

EVERY building can have a roof that will not rot—that will scorn the need of gravel or slag to protect it. Johns-Manville Asbestos Roofing rids itself of extra surfacing because the roofing felts are made of asbestos rock fibre, impregnated with asphalt. These stone felts will not rot, dry out nor burn. They are everlasting. Hence Asbestos Roofing frees your roof of the burden of unnecessary weight, and saves you the trouble and cost of frequent repairs and replacements.

JOHNS-MANVILLE CORPORATION, Madison Ave. at 41st St., New York
*Branches in all large cities.* For Canada: CANADIAN JOHNS-MANVILLE CO., LTD., TORONTO

# JOHNS-MANVILLE
## ASBESTOS ROOFINGS

An increasingly large portion of the actual income derived from car card advertising service must be devoted to building and maintaining the prestige of car card advertising in the face of the active competition of all other media.

Creating and protecting our mutual interest is a costly item.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

INSECT PROOF
WOODPECKERS and white ants are not a menace to *International* Pressure Creosoted Yellow Pine Poles. The creosote oil, a toxic to white ants, is forced far into the cells of the timber due to ability of yellow pine to take deep penetration. Experience also proves that woodpeckers do not attack Creosoted Pine Poles.
Even in localities where white ants totally honey-combed pole lines and where woodpeckers so completely riddled the poles as to necessitate the replacement of entire lines with Creosoted Pine — the Creosoted Pine Poles proved practically immune.
*International Creosoted Pine Poles in the line of the Eastern Texas Electric Co., Beaumont, Texas.*
International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont
International
Creosoted Yellow Pine Poles

*Where performance counts*

use

Le Carbone Carbon Brushes.

*They talk for themselves*

**W. J. Jeandron**

Factory Terminal Bldg.,
Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

# PANTASOTE

Trade Mark

Seat and Curtain Materials

*There is no substitute for Pantasote*

# AGASOTE

Trade Mark

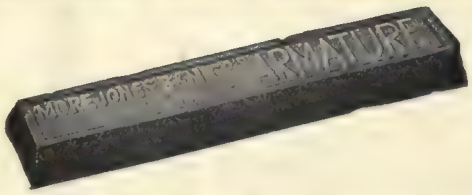
Roofing—Headlining—Wainscoting

*The only homogeneous panel board*

*standard*
*for electric railway cars*
*and motor buses*

People's Gas Bldg., Chicago, Ill.

## *M-J Armature Babbitt*




No less than twenty-five different grades of Babbitt have been successfully perfected in the More-Jones line, designed for various services and at varying prices. "Armature" for electric railways is the recognized standard. *Let us quote you.*

More-Jones Brass & Metal Co.
St. Louis, Mo.

**MORE-JONES QUALITY PRODUCTS**

## Griffin Wheel Company

410 North Michigan Ave.
Chicago, Ill.

# Griffin Wheels

with
Chilled Rims
and
Chilled Back of Flanges
For Street and Interurban Railways

FOUNDRIES:

| | | |
|---|---|---|
| Chicago | Boston | St. Paul |
| Detroit | Kansas City | Los Angeles |
| Denver | Council Bluffs | Tacoma |
| Cleveland | Salt Lake City | Cincinnati |

# FOR SAFETY FROM FIRE INSTALL THE

IMPROVED Pyrene TRADE MARK FIRE EXTINGUISHER

Safety demands that every car or bus be equipped with a Pyrene Fire Extinguisher. The riding public expect and are entitled to the protection from fire which this extinguisher assures.

Aside from the protection from fire afforded by such installation, to both rolling stock, operator and passengers, the schedule of the Central Traction and Lighting Bureau specifies a charge of 5¢ on motor buses, 3¢ on interurban and 1¢ on urban cars, for the absence of fire extinguishers.

The slight outlay involved by having rolling stock equipped with an Improved Pyrene (one-quart) Fire Extinguisher should be regarded as an investment—a device that helps make safety from fire certain should be popular.

Safety adds to the revenue of the operating company by inspiring confidence in the riding public toward modern transportation.

Many of the leading Public Service Corporations recognize this and have equipped their cars and buses with Pyrene Fire Extinguishers—they know a burning car or bus need not be abandoned if a Pyrene Fire Extinguisher is at hand.

For the protection of electrical equipment, power houses, car barns, shops and storerooms Pyrene (1½ quart) Fire Extinguishers are dependable in every emergency.

PYRENE MANUFACTURING CO.
NEWARK, N. J.

*"Fortify for Fire Fighting"*



# Nuttall

## and Timken!

*Nuttall US 20A Trolley Base*
*Equipped with Timken Tapered Roller Bearings*

Two old-time names in which the public has a lot of confidence. Both companies make products in which the public has had a lot of confidence for a long time. Just try to imagine how many people are riding on Timken Bearings and under Nuttall Trolleys right today.

And now the Nuttall US 20A trolley is equipped with Timken Swivel Bearings—and that settles the bearing question—the friction question.

It is also equipped with a system that settles the lubrication question—fill the reservoir about twice a year, and forget it.

It is equipped with 1000 Ampere Capacity Shunts and that settles the arcing question.

Now Nuttall settles another question—the price question.

*Send for specifications and proposition.*

R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Nuttall

# Bankers and Engineers


**Ford, Bacon & Davis**
Incorporated
**Engineers**
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

**The J. G. White Engineering Corporation**
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

**STONE & WEBSTER**
Incorporated
EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
New York Boston Chicago

**THE BEELER ORGANIZATION**
Transportation, Traffic, and Operating Surveys
Coordinating Service—Financial Reports
Appraisals—Management
52 Vanderbilt Ave. New York

**SANDERSON & PORTER**
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

**ENGELHARDT W. HOLST**
*Consulting Engineers*
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

**ALBERT S. RICHEY**
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

**LINN & MARSHALL, *Inc.***
*Financing — Engineering — Management*
PUBLIC UTILITIES
ELECTRIC RAILWAYS — MOTOR BUSES —
GAS — ELECTRIC
25 Broadway, New York City

C. B. BUCHANAN, President — W. H. PRICE, JR., Sec'y-Treas — JOHN F. LAYNG, Vice-President
**BUCHANAN & LAYNG CORPORATION**
*Engineering and Management, Construction*
*Financial Reports, Traffic Surveys*
*and Equipment Maintenance*
BALTIMORE 1904 Citizens National Bank Bldg. — Phone: Hanover: 2142 — NEW YORK 49 Wall Street

**DAY & ZIMMERMANN, INC.**
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

**HEMPHILL & WELLS**
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
*APPRAISALS*
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

**STEVENS & WOOD**
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION YOUNGSTOWN, O. FINANCING MANAGEMENT

**WALTER JACKSON**
*Consultant on* Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

**McCLELLAN & JUNKERSFELD**
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

**KELLY, COOKE & COMPANY**
ENGINEERS
Operation and Management
Traffic and Transportation Surveys
PARKWAY at SIXTEENTH ST. PHILADELPHIA

**J. ROWLAND BIBBINS**
*Engineer*—2301 Connecticut Ave., N.W., Washington, D. C.
TRANSPORTATION SURVEYS
Organized Traffic Relief and Transit Development
Co-ordinating Motor Transport, Railroad and City Plans, Service, Routing, Valuation, Economic Studies
EXPERIENCE IN 20 CITIES

# THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

**Builders since 1868 of Water Tube Boilers of continuing reliability**

BRANCH OFFICES

BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

**Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893**

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 444 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

Commercial Co-ordination of Transportation

## A. B. Cole

Commercial Consultant
500 Shelbourne Ave., Wilkinsburgh, Pa. (Pittsburgh)

Our advertisement in the issue of March 5 showed how

## HASKELITE and PLYMETL

help produce modern street cars that invite the rider and are economical to operate. Haskelite and Plymetl have been specified on a recent order for 24 cars being built by National Steel Car Corp.
*Another ad will appear next week.*

HASKELITE MANUFACTURING CORPORATION
133 W. Washington St., Chicago, Ill.

## KELKER, DELEUW & CO.

CONSULTING ENGINEERS
REPORTS ON
Operating Problems · Valuations · Traffic Surveys
111 W. Washington Street, Chicago, Ill.

UNA
RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD
UNA Welding & Bonding Co
Cleveland, Ohio.

## THE P. EDWARD WISH SERVICE

50 Church St. NEW YORK · *Street Railway Inspection* DETECTIVES · 131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

## INDUSTRIAL GASES

OXYGEN
ACETYLENE
I.O.C. SYSTEM
HYDROGEN
NITROGEN

Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.

International Oxygen Co., Main Offices: Newark, N. J.
Branches: New York · Pittsburgh · Toledo

## Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

## ARCHBOLD-BRADY CO.

Engineers and Contractors · SYRACUSE, N. Y.

Type R-11
Double Register

## International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

## The International Register Co.

15 South Throop Street, Chicago, Illinois

THE WORLD'S STANDARD

## "IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation · Flexible Varnished Tubing
Insulating Varnishes and Compounds

## Irvington Varnish & Insulator Co.

Irvington, N. J.
*Sales Representatives in the Principal Cities*

"STANDARD"
STEEL PRODUCTS

Steel Axles Steel Springs
Armature Shafts
Rolled Steel Wheels

STANDARD STEEL WORKS COMPANY
PHILADELPHIA, PA.
BRANCH OFFICES
CHICAGO NEW YORK PORTLAND SAN FRANCISCO ST. LOUIS
PITTSBURGH HOUSTON RICHMOND ST. PAUL MEXICO CITY
WORKS: BURNHAM, PA.

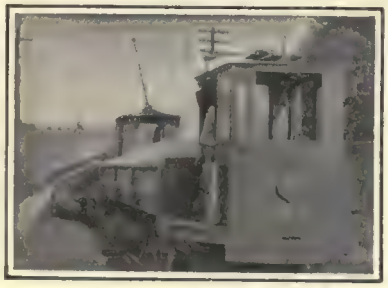
B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.
Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York
BRANCH OFFICES
Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Feasible Drop Brake Staffs
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Anderson Slack Adjusters
Economy Electric Devices Co., Power Saving and Inspection Meters
"Topeseald" Lamps
Bus Lighting Equipment
Cowdrey Automotive Brake Testing Machine

The DIFFERENTIAL CAR



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential 3-way Auto Truck Body
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

# *Helping Manufacturers to Serve You More Efficiently*

Through McGraw-Hill questionnaires we have been able to give manufacturers facts which have helped them standardize on sizes most acceptable in a particular industry.

We have also through McGraw-Hill questionnaires been able to convince manufacturers that they have been delinquent in rendering service.

So when you receive a McGraw-Hill questionnaire you can fill it out, confident that it will return to you in the form of better service to your business.

THE PUBLISHERS

# SEARCHLIGHT SECTION

## USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

*Positions Wanted*, 4 cents a word, minimum 75 cents an insertion, payable in advance.

*Positions Vacant* and all other classifications, 8 cents a word, minimum charge $2.00.

*Proposals*, 40 cents a line an insertion.

INFORMATION:

*Box Numbers* in care of any of our offices count 10 words additional in undisplayed ads.

*Discount* of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$5.50 an inch
4 to 7 inches.....4.30 an inch
8 to 14 inches.....4.10 an inch

Rates for larger spaces, or yearly rates, on request

*An advertising inch* is measured vertically on one column, 3 columns—30 inches—to a page.

## To Employers Who Advertise for Men:

The letters you receive in answer to your advertisements are submitted by each of the applicants with the hope of securing the position offered.

When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. Others do not receive the slightest indication that their letters have even been received, much less given any consideration. These men often become discouraged, will not respond to future advertisements, and sometimes even question if they are bona fide.

**We** can guarantee that *Every Advertisement Printed in the Searchlight Section Is Duly Authorized.* Now won't **you** help keep our readers interested in this advertising by acknowledging **every** application received, even if you only return the letters of unsuccessful applicants to them marked, say, "Position filled, thank you." If you don't care to reveal your identity, mail them in plain envelopes.

We suggest this in a spirit of helpful co-operation between employers and the men replying to Positions Vacant advertisements.

***Searchlight Department***
**McGRAW-HILL CO., Inc.**

***"Put Yourself in the Place of the Other Fellow"***

6000

### POSITIONS VACANT

ASSISTANT to engineer, M. of W. graduate. Write experience—salary expected. Box 781, East Liverpool, Ohio.

### POSITIONS WANTED

GOOD, versatile man of personality and character. Successful record as transportation executive. Particularly adapted to personnel work. Correspondence solicited. PW-981, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

OPERATING official available. Broad experience, fine record of achievements, city and interurban properties, East and Central West. Recognized ability, successful in handling labor, public relations, selling transportation, increasing revenue, accident prevention, solving traffic problems. Progressive, efficient and a worker for results. Fine references. Correspondence and appointments for personal interview invited. PW-977, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

SUPERINTENDENT of railways with 20 years' experience, desires for personal reasons to make change. Nation wide reputation as railway operator. Can take full charge. Has ability to handle men and show results, correspondence invited and treated in confidence. PW-979, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

UTILITIES executive available. Engineering graduate, broad operating and executive experience, railway, also light and power. Young and progressive with tried and proven ability. Railway activities known to the industry. At present employed; seek opportunity with larger interests. The opportunity for past successful methods to produce relatively greater results. PW-972, Electric Railway Journal, Tenth Ave. at 36th St., New York.

### SALESMAN AVAILABLE

LET me put on your preferred stock customer ownership sale. Can successfully conduct campaign of any size and handle both sales and accounting details. Wide experience. Highest of references. SA-980, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

**FOR SALE**

### Rotary Converters

2—G. E. Co., 300 kw. type T.C. 6-300-1200 form P. 1200 r.p.m., 60 cycle, 6 pole, 600 volt, direct current rotary converters.

### Transformers

4—G. E. Co., 150 kw. type H, form SPQT 2300-v./370 v. O.I.S.C. transformers with reactance coils, field rheostat, aluminum cell lightening arresters, equalizer switches, starting switches. In first class condition. Low price. Delivery April 1, 1927.

**JOHN C. GILPIN, Esq.**
**1500 Liberty Trust Bldg., Phila., Pa.**

**FOR SALE**

### 15 BIRNEY SAFETY CARS

**Brill Built**
**West. 508 or G. E. 264 Motors**
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(Continued on page 38)

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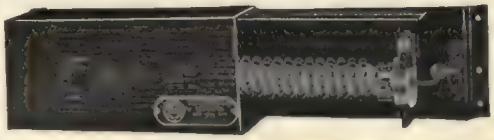

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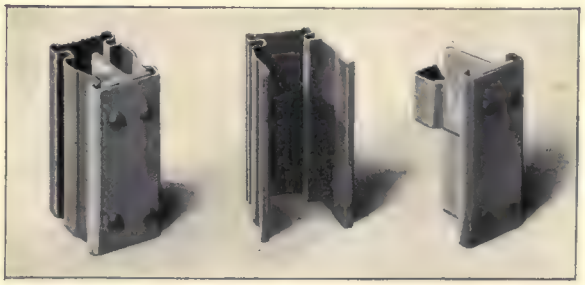
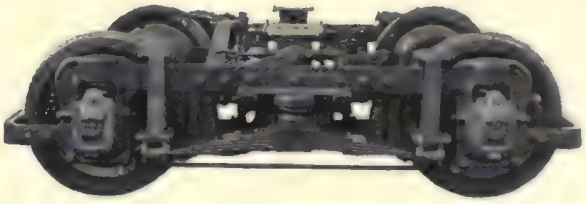
Brill No. 201-B Seat.

2



Sections showing construction of Brill "Renitent" Posts.

3



The low-level, easy-riding and sturdily built Brill 177-E Truck.

**THE J. G. BRILL COMPANY**

PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO — WASON MANF'G CO. SPRINGFIELD, MASS.

The modern car is a real asset. Through its attractiveness and speed, it increases income; and on account of its lower maintenance and power requirements, it decreases outgo.

# A loser for 16 years becomes a profit maker

The Buffalo & Erie Railway earned in 1925 a profit for the first time since its completion in 1909. And this was accomplished in the face of a business depression in that locality.

The management attributes this transformation to the use of modern light-weight one-man cars, with which this company renders the utmost in attractive service. In addition, operating cost was reduced 14.4 per cent and gross revenue was increased 7.5 per cent in the first 10 months.

These new cars, equipped with four G-E 247 motors, K-35 control, and CP-27B compressor, are capable of a speed of 60 miles per hour. Energy consumption is less than 2 kw-hr. per car mile. A comparison of operating figures per car mile shows:

| | 1924 (Old Cars) | 1925 (New Cars) |
|---|---|---|
| Way and structures | 5.6¢ | 3.1¢ |
| Equipment | 2.3¢ | 1.9¢ |
| Power | 5.0¢ | 3.4¢ |
| Transportation | 14.0¢ | 10.7¢ |
| General and miscellaneous | 10.6¢ | 9.8¢ |
| Total | 37.5¢ | 28.9¢ |

General Electric equipment has played an important part in the successful modernization of numerous roads. It has helped to make many of the operating records which have proved conclusively the value of the modern light-weight car.

330-40

# GENERAL ELECTRIC

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# ELECTRIC RAILWAY JOURNAL


# Verified!

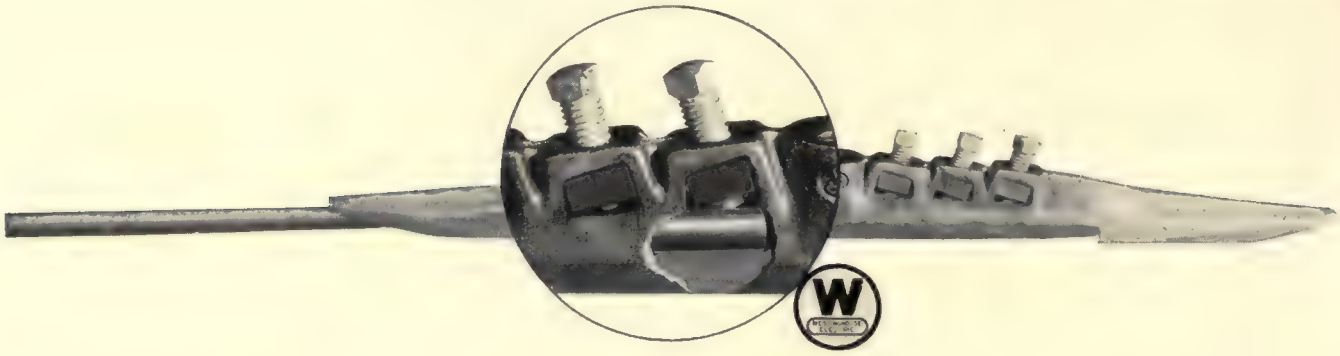
Engineers, *all over the world will verify these points on Twin Tie track installations.*

| | | |
|---|---|---|
| 1 | *The first cost is low* | Economy of concrete and grading make the complete track cost less than any other concrete design . . . Steel Twin Ties cost about one-dollar-per-track-foot in Cleveland. |
| 2 | *The construction is renewable* | Steel Twin Tie Construction gives you a permanent foundation on which a complete and approved method of rail renewal has been worked out. |
| 3 | *The structure is uniform* | A combination of track foundation and paving, uniform in its action under both car and vehicle traffic. |
| 4 | *New methods of installation* | New methods of initial installation, designed to insure complete bearing, eliminate shrinkage and make rail renewal easy. |

**The International Steel Tie Co.**
**Cleveland, Ohio**

20% more bearing surface

*steel* Twin Tie *track*



# How Those *Rocking Nuts* Do Hold!

INCREASED pull just makes the screws dig down into the copper and take hold with a tighter grip.

Note what happens as the pull comes on the wire. The corner of the nut acts as a fulcrum, forcing the tip of the screw downward and pressing the wire against the bottom of the splicer. The wire is held in a grip that increases with the tension, increasing also the conductivity of the splicer.

The gripping power produced by rocking nuts is found only in Westinghouse line material.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

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# Westinghouse

X91118

## Line Material With Rocking Nuts

UB Section Insulator (Single Beam)

CL Splicer

Keeping Your Overhead *Down* by Keeping it UP

DB Section Insulator (Double Beam)

RB Splicer

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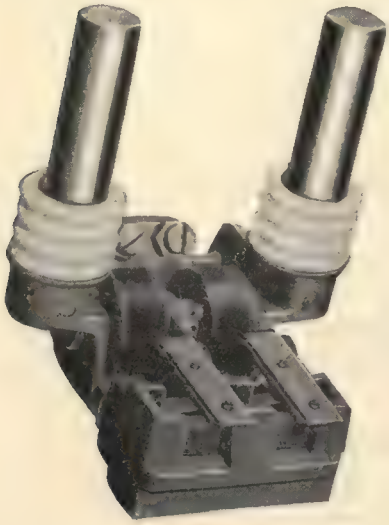
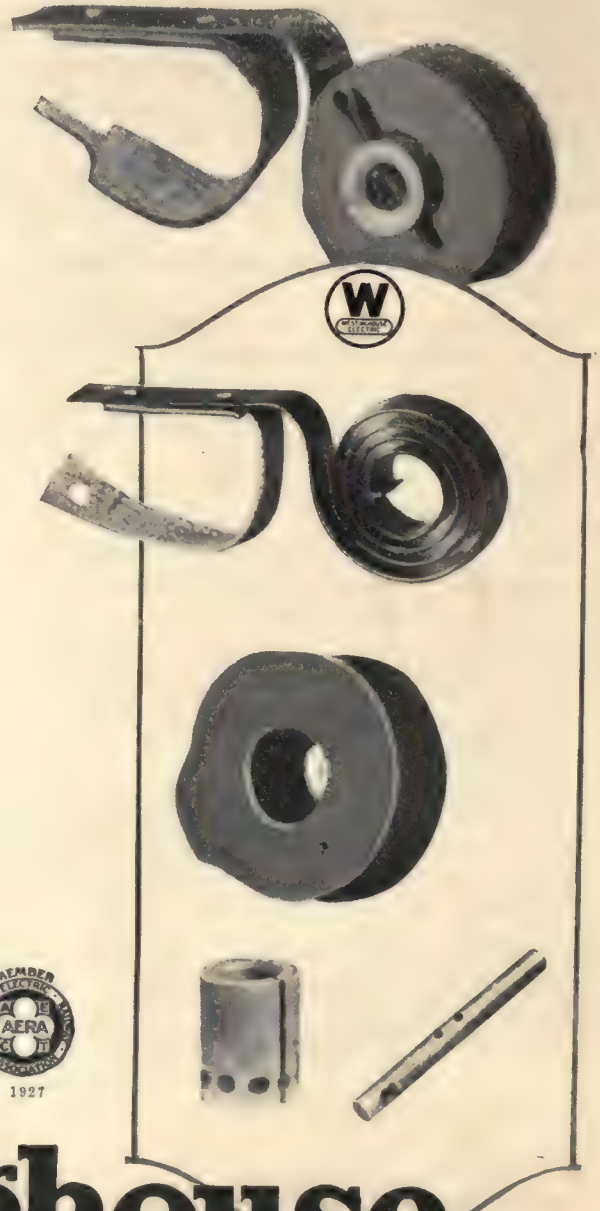
# Standardize

## your brushholders



## With these Twin Washer Fingers



1. The construction for practically all brushholders is the same.
2. Wear of spindle has been eliminated by centering all movement in the spring.
3. Elimination of wear and simplicity of parts insure a reduction of maintenance and stocks for brushholders.
4. Westinghouse Twin Washer Fingers are designed to replace the ratchet types with little or no change in the brushholder.

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East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

MEMBER AERA 1927

# Westinghouse

X91103

# Peak Hour Economy

During peak hours, effective operation of ordinary brake equipment on modern light weight cars is diminished with the loading of commuting crowds—just when adherence to schedules is of the utmost importance. This condition is remedied by the

**WESTINGHOUSE VARIABLE LOAD BRAKE!**

During peak hours, schedules must be fast and consistent, especially through congested districts, to command passenger good will and patronage. This means that maximum speed must be maintained longer between stops than is possible without the

**WESTINGHOUSE VARIABLE LOAD BRAKE!**

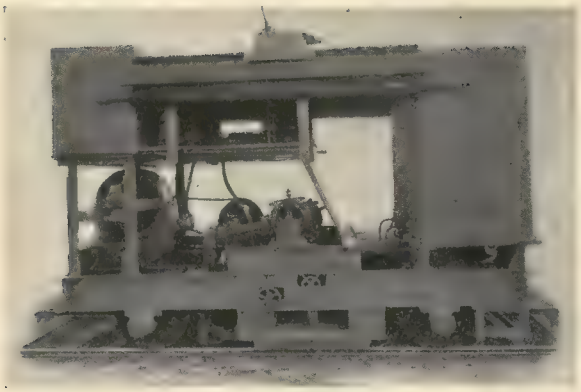
During peak hours, every traction company counts its minutes saved collectively in terms of dollars. You can Save Money At Every Stop and get the utmost out of your rolling stock by using the

**WESTINGHOUSE VARIABLE LOAD BRAKE!**

**Westinghouse Traction Brake Company**
General Office and Works: Wilmerding, Pa.

# WESTINGHOUSE TRACTION BRAKES

Known By Their Records
SERVICE results not otherwise obtainable account for the fact that O-B Line Materials, Bonds and Car Equipment Specialties are the most widely used in the industry.
The lower maintenance and longer life of these materials and devices are important, but O-B design looks even beyond these factors. It contemplates utmost freedom from failure on the part of these small items, so that they may be an aid to, not a liability against, delay-free transportation. Ohio Brass Company, Mansfield, Ohio.
342CB
Ohio Brass Co.
SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES
PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES



Heavy Duty Reciprocating Grinder

# Saving the rail

ANY maintenance program that does not include an ample appropriation for track maintenance is neglecting to take the first step first. Whatever may be the right move to improve conditions on your road, results will be improved by good track.

If the program requires new cars, it takes good track to produce comfortable rides.

If aggressive selling and advertising are scheduled, it takes good track to make the service saleable.

Is new financing needed? Good track is the soundest investment.

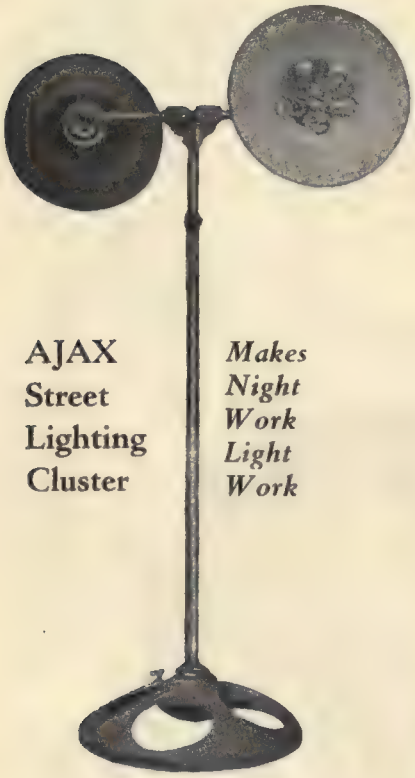
Is private car competition keen? Compete with comfortable rides on good track.

Is the paving burden heavy? Good rail maintenance saves the whole track structure.

No matter what call there may be for available funds, the outstanding importance of track maintenance must be kept ever in mind.

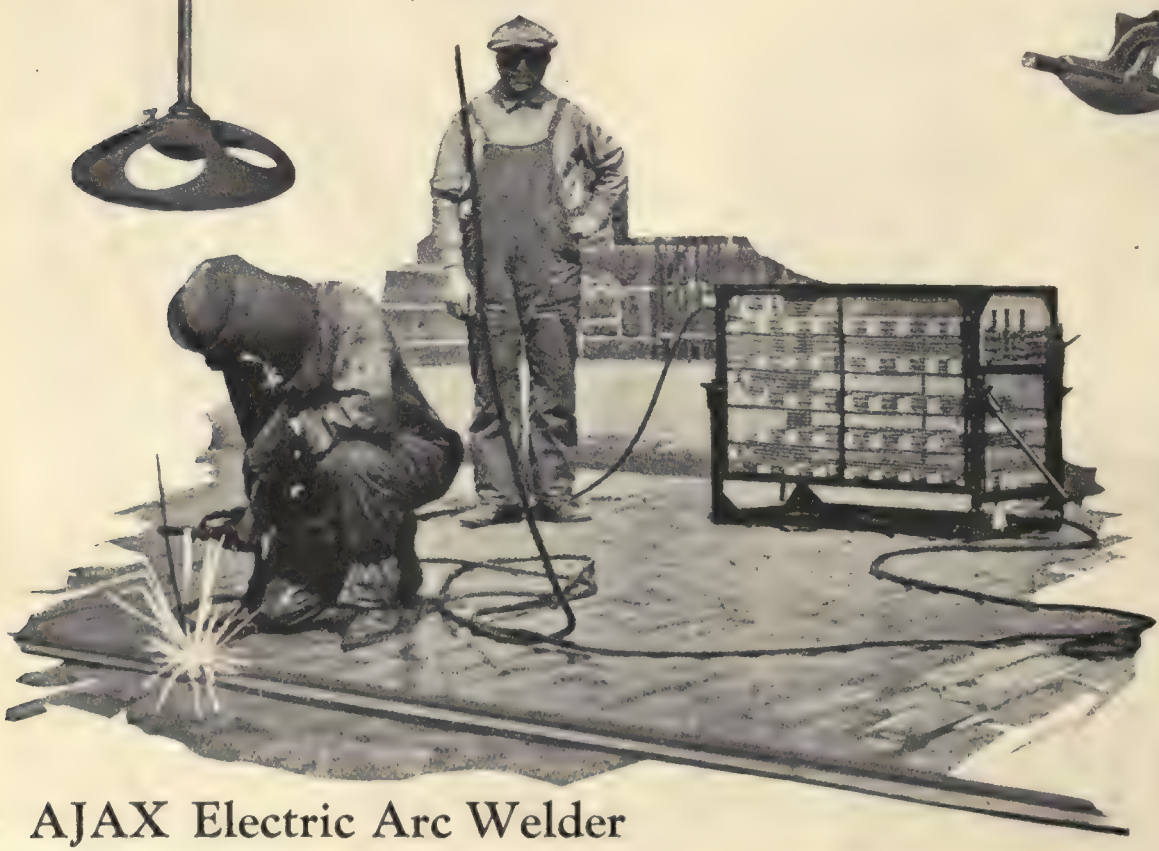
Trim expenditure if you must, but don't neglect the rails.

Take the first step first—set aside enough to keep the rail in prime condition always.



**AJAX Street Lighting Cluster**

*Makes Night Work Light Work*



**AJAX Contact Pole and Hook—**

*Need not be removed to let the cars pass*

AJAX Electric Arc Welder

# saves the railway

TRACK maintenance starts with rail maintenance. If the rails are kept always in good condition, the track structure is saved. Every corrugated rail, every cupped joint, every battered frog, switch and crossing pounds the life out of your track foundation and boosts equipment maintenance costs.

Every dollar skimped in track maintenance is paid out with usurious interest in other departments. Keeping everlastingly at it is the keynote of track maintenance economy.

Grinding and arc welding, little and often, make good track easy to own.

By specializing on rail maintenance equipment for years, we have developed a machine for every need.

Whether you need a reciprocating grinder for removing corrugations or a rotary grinder for removing surplus weld metal or an electric arc welder, here is proven equipment.

Hundreds of roads, here and abroad, are successfully using the equipment shown on these pages.

Insist on sufficient track maintenance funds to acquire the machines you need. And then keep them everlastingly busy.

**Railway Track-work Co.**

3132-48 East Thompson Street, Philadelphia

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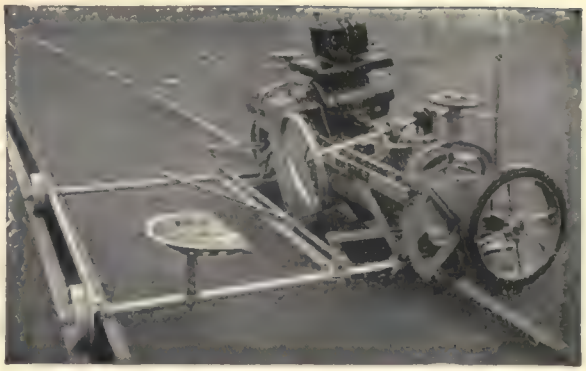
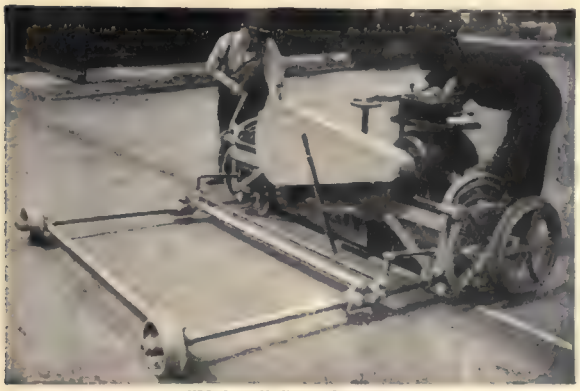


"Improved Atlas" Rail Grinder

Reciprocating Track Grinder

"Imperial" Track Grinder

"Hercules" Swing Frame Rail Grinder

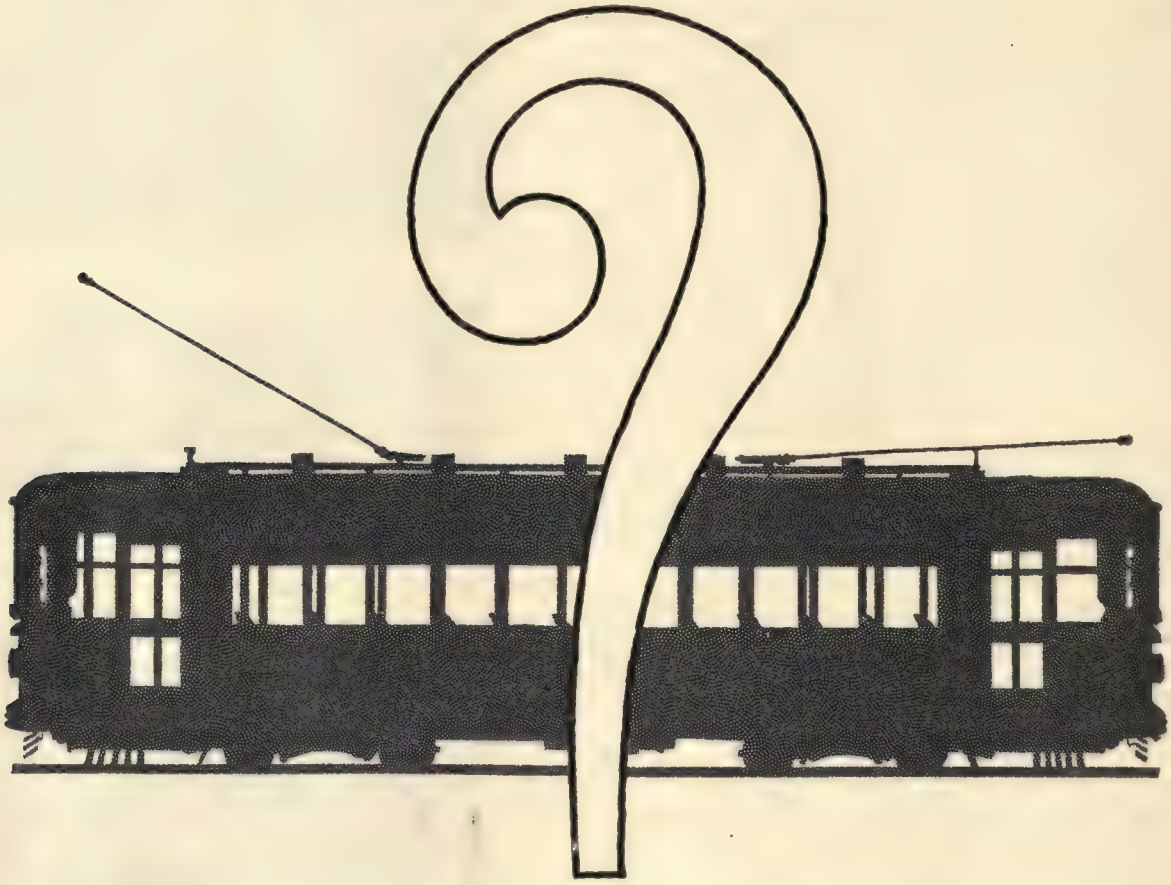


"Vulcan" Rail Grinder

"Midget" Rail Grinder

O.S.T. 1663

# WHAT MAKES A CAR MODERN



NP

MODERN brakes contribute to safety but they are only part of the ultimate safety requirements. Modern motors contribute to running speed but fail to reduce standing time. Cushioned seats contribute to comfort but cannot relieve uncomfortable congestion at the entrances and exists. To be modern, therefore, a car must be equipped to meet all possible requirements in—

## SAFETY
## SPEED
## COMFORT

*for* Safety

it is fully as important to protect your boarding and alighting passengers as it is to guard against collision. The completely modern car is, therefore, equipped with National Pneumatic Door and Step Control in addition to efficient braking systems.

*for* Speed

a reduction in standing time is fully as important as an increase in the running speed. The completely modern car is, therefore, equipped with National Pneumatic Door and Step Equipment in addition to a modern set of motors.

*for* Comfort

it is fully as important to relieve congestion in the aisles and on the platforms as it is to furnish comfortable seats. It is equally important to prevent noisy, irritating or discourteous operation of the doors. In addition to all other comfort features, therefore, the completely modern car is equipped with National Pneumatic Door and Step Controlling Systems.

NP

# National Pneumatic Company

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50 Church Street, New York

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Rahway, N. J.

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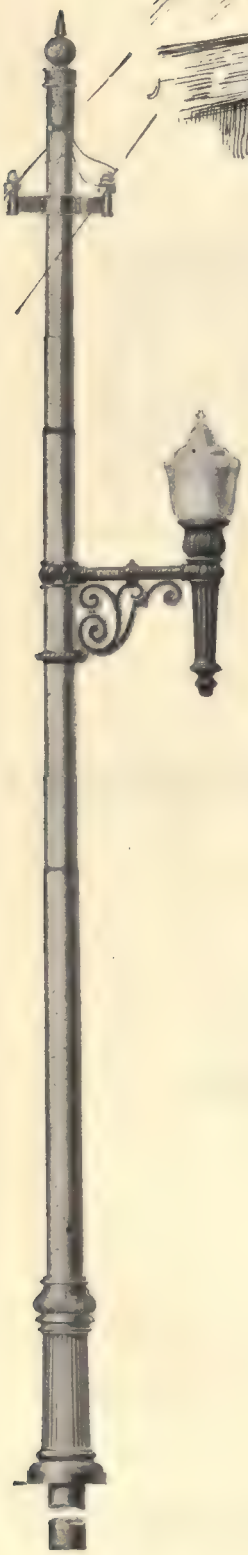


# Secretary to the Secretary's Secretary

REMEMBER the old story of the business so highly organized that everybody had a secretary? Every secretary had a secretary and every secretary's secretary had a secretary.

Ridiculous! Of course. One could do all the work. But what more foolish than cluttering up the streets with three or four useless poles when one will do the job?

Clean up your streets-overhead, with Elreco Tubular Steel Poles!

Handsome in themselves, they permit lighting wires to be strung unobtrusively at the top. With any type of Novalux Lighting Unit mounted, Elreco poles present a clean, trim appearance. A contribution to any thoroughfare. Nor is this all—

Elreco poles are stronger, lighter in weight, *more adaptable more economical to install and maintain.* Three or four companies using one pole, instead of each buying its own, naturally reduces the cost.

If you would add to your prestige and profit, and it's poles you want, we can help you. Ask us.

## The Electric Railway Equipment Co.

**Cincinnati, Ohio**

**New York City: 30 Church Street**

# A Safe Foundation

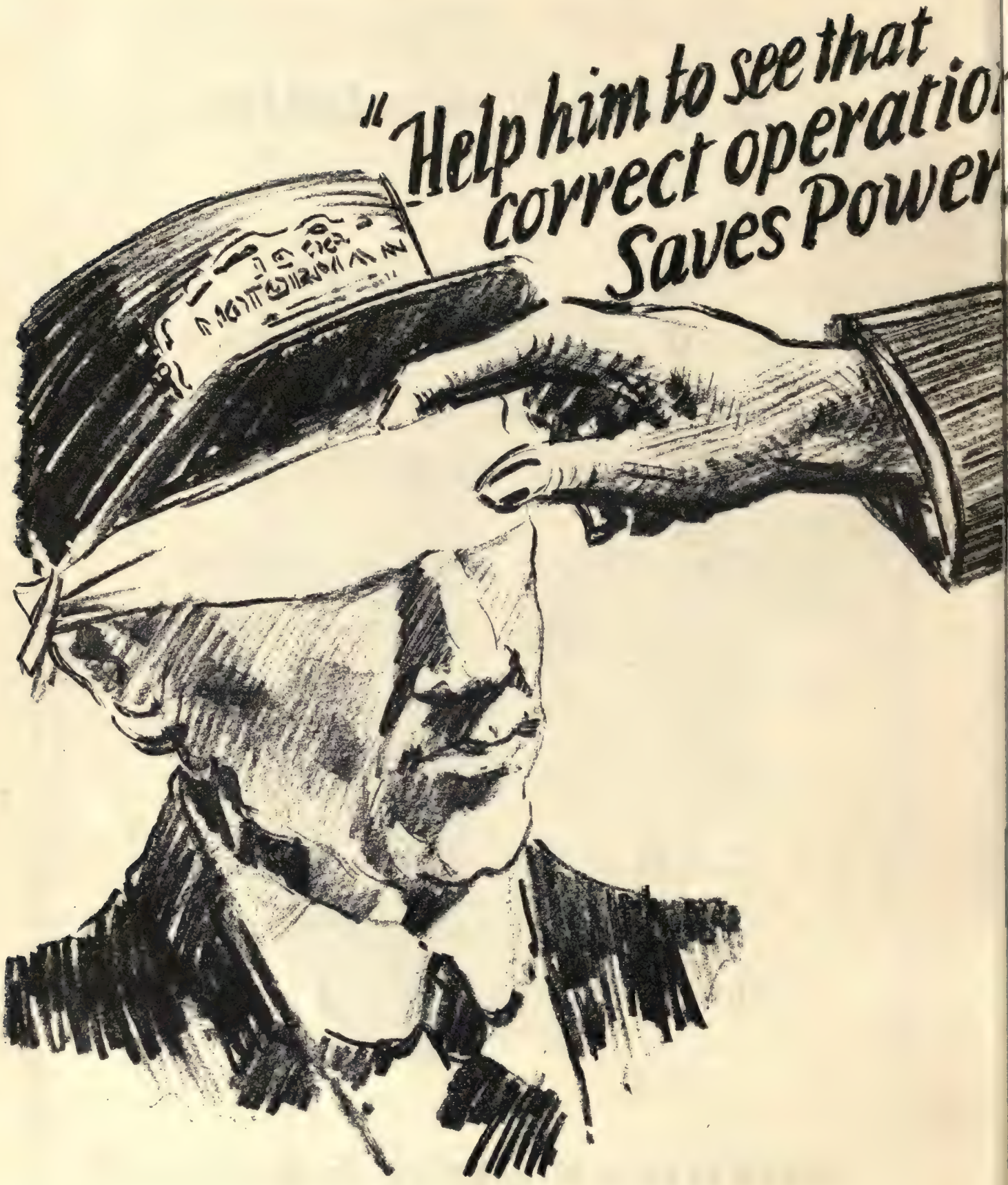
Build the modern car from a safe foundation by using Davis "One-Wear" Steel Wheels.

They have an unequalled resistance to impact, gained through the use of high manganese, heat-treated steel.

Davis "One-Wear" Steel Wheels are the utmost you can do for safety.

**AMERICAN STEEL FOUNDRIES**

NEW YORK CHICAGO ST. LOUIS


"Help him to see that
correct operatio
Saves Power

# "Your motormen can save over 11% of your power!"

ARE your motormen *continually* trained and stimulated toward correct car operation? The ECONOMY Meter is a welcome tool which assists each man to improve by giving him a measure of his operating efficiency.

It also shows each motorman just how much energy his car uses. Saving energy saves money—and few men are willfully wasteful.

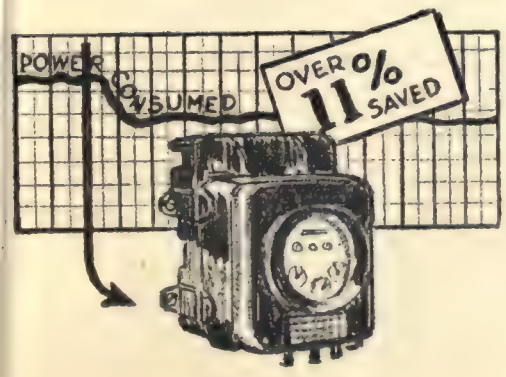
Because the ECONOMY Meter measures what he is trying to save, the motorman can satisfy himself as to the most economical methods of operation. His interest is held and he *does save.*

# ECONOMY METERS

To your Mechanical Department the Car Inspection Dial automatically announces the inspections due directly in accordance with the actual work that the equipment has done. No clerical work is necessary.

Whether you generate or purchase power, the savings effected through the use of ECONOMY Meters are real savings for the Transportation, Electrical and Mechanical departments.

Install ECONOMY Meters now. You can have two years to pay. Meanwhile the meters will earn over twice their cost. May we tell you more?




ECONOMY ELECTRIC DEVICES COMPANY
37 W. Van Buren St., Chicago

Sangamo Economy Meters — Woods Fare Boxes
Peter Smith Heaters — Bemis Boyerized Truck Specialties
Haskelite and Plymetl

# It's the SERVICE behind the Equipment that Counts

A policy of honest and dependable service has always been one of the strongest links between Ingersoll-Rand Company and its customers. By careful attention to the needs of each customer and genuine interest in his problems the Company has established a feeling of confidence and good will.

This combination of high-class equipment and reliable service means fewer shut-downs—additional profits—lasting satisfaction.

**INGERSOLL-RAND COMPANY, 11 Broadway, New York City**

For Canada refer Canadian Ingersoll-Rand Co., Limited, 260 St. James St., Montreal

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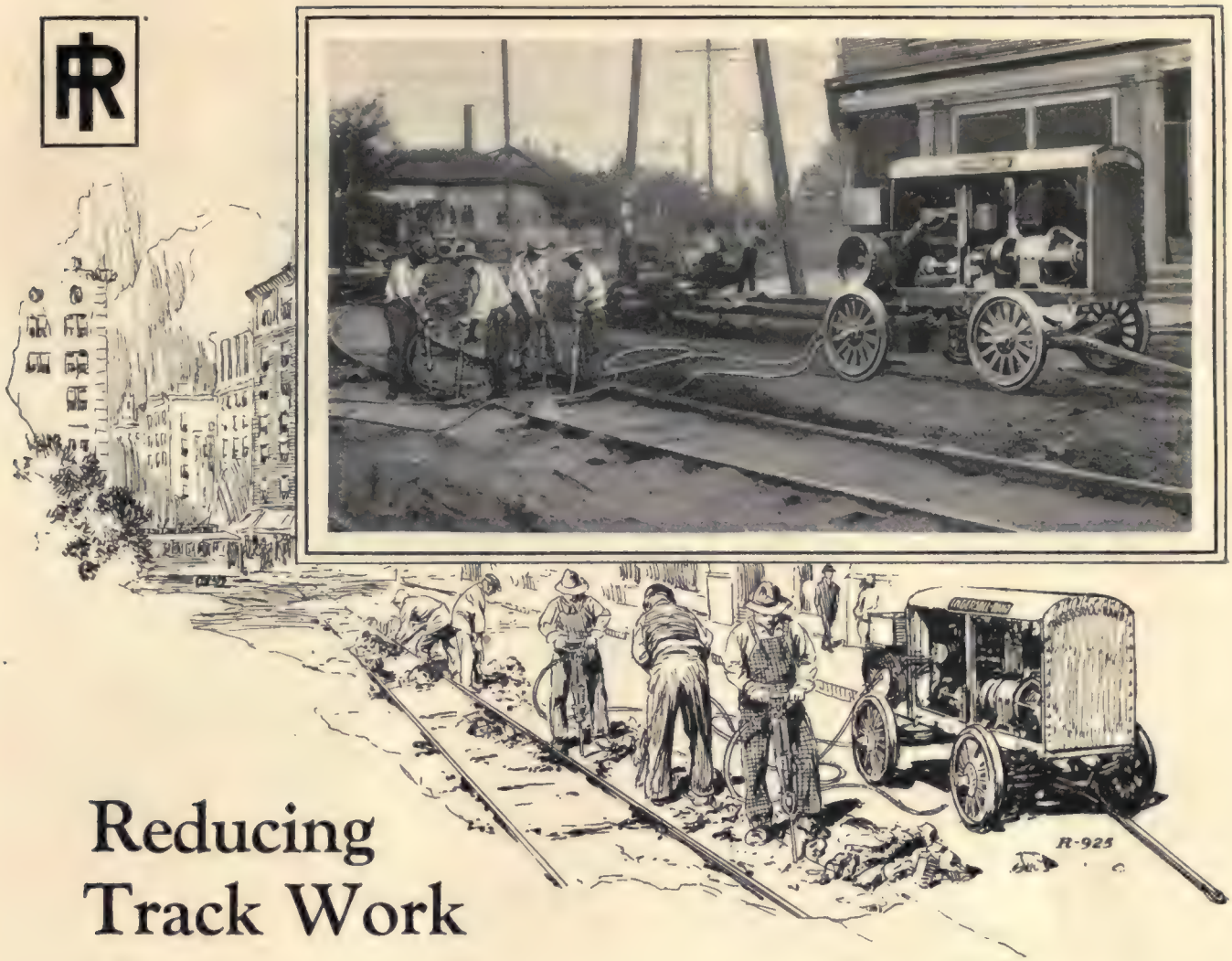
DALLAS DETROIT DENVER DULUTH EL PASO HOUGHTON JOPLIN KNOXVILLE
LOS ANGELES NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH POTTSVILLE
SAN FRANCISCO SALT LAKE CITY SCRANTON SEATTLE ST. LOUIS WASHINGTON




# Reducing Track Work Costs

Figure on a basis of I-R cost-reducing machines when making your plans for 1927 track work. There are six different sizes of Ingersoll-Rand Portable Compressors, and a complete range of air tools for electric railway service. Experienced engineers at I-R service stations will help you make your choice and will teach your men the latest time-saving methods of operation.

Cost data received from railway properties all over the country show that where ten men were necessary in the past, two men with I-R Pneumatic Tools can now do the same job in considerably less time—and can do it a great deal better. Ask for complete information.

A new edition of "100 and 1 Ways to Save Money With Portable Compressors" is now available. Write for a free copy. This 140-page book will show you many ways in which I-R Pneumatic Machines will save time and money in your track work.

**I-R Labor Aiding Track Tools and Machines include:**

Portable Compressors
- Gasoline or Electric
- Six Sizes

Paving Breakers
Tie Tampers
Rail Drills
Grinders
Riveters
Spike Drivers
Pneumatic Saws
Rock Drills

**INGERSOLL-RAND COMPANY, 11 Broadway, New York City**

*Offices in principal cities the world over*

For Canada Refer Canadian Ingersoll-Rand Co., Limited, 260 St. James Street, Montreal, Quebec.

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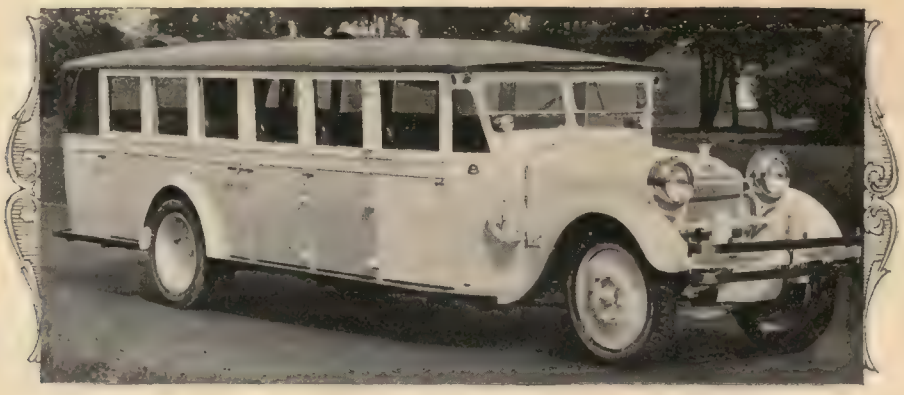
# Ingersoll-Rand



# Leece-Neville Rounds Out White Excellence

The White Motor Co. was the first maker of motor coaches to adopt Leece-Neville Patented Voltage Regulation as standard equipment.

Their desire to give customers only the best, and to build a motor coach which will give the buyer the greatest possible number of profitable revenue miles, led them to an early recognition of the almost indispensability of this equipment.

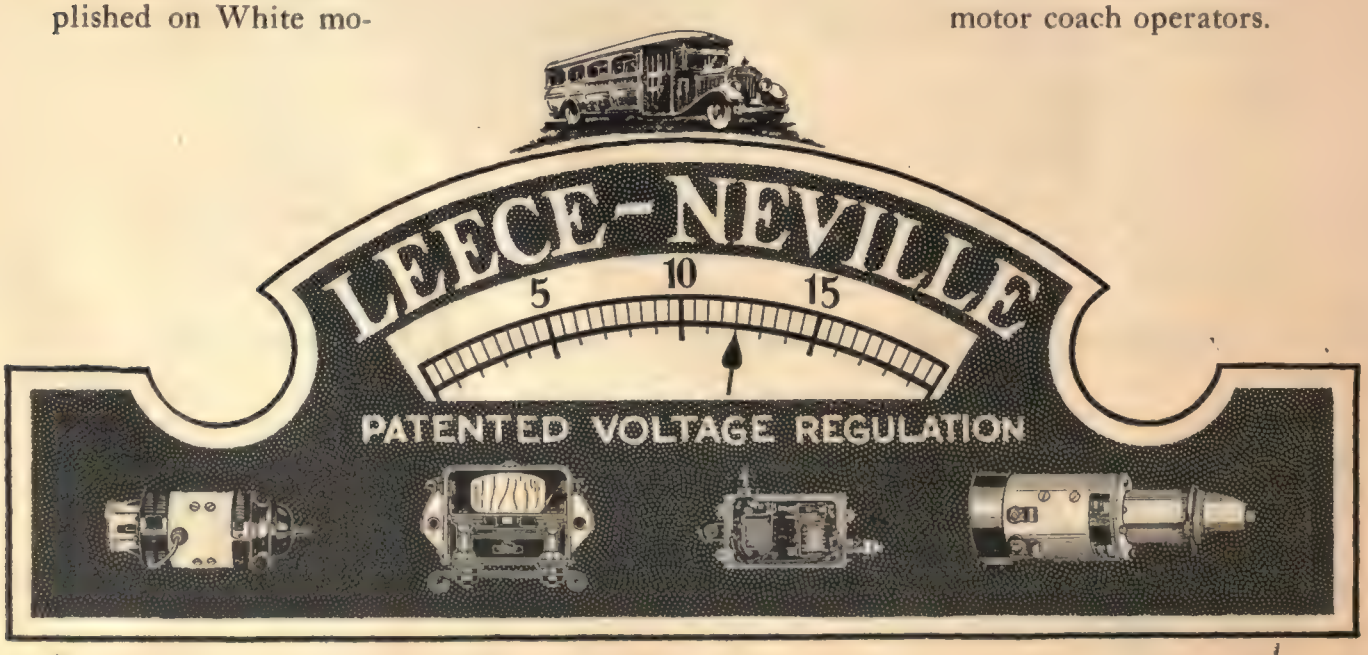
What it has accomplished on White motor coaches is history—history written in countless stories of battery mileages multiplied.

Leece-Neville Patented Voltage Regulation makes overcharge impossible, insures correct charging rate, and keeps lights steady.

You will find it standard on any good Motor Coach.

There is a constantly increasing demand for Leece-Neville electrical equipment from motor coach operators.

**The Leece-Neville Co.**
5353 Hamilton Ave.,
Cleveland, Ohio



# Add years—

**of maintenance-free life to old track!**

**Before—**

...o the Vanishing Point

# JOINTS

# REPAIRING

## A Temporizing Program of Patching Over and Over Causes

AS THE chain is no stronger than its weakest link, so also the railway track is no better than its poorest joint. Its life is limited by the life of the joints.

There are many methods used for repairing joints. Most of them are at best but temporary expedients to extend the life of the track a few years longer.

In many cases the method is to open up the track around the joint, take off the plates, turn them upside down, then weld them on again. But these plates were never designed for this. Furthermore there is always a gap left between rail ends and the receiving rail cannot be raised without expensive blacksmithing of the bars.

No matter how you do the job, the cost of opening up the track will be the same. When you have gone to this expense, why not do the right thing, the permanent thing, the most economical thing in the long run, namely—Thermit weld those old joints.

## A Consistent Program of Thermit Welding Brings

# ELIMINAT

# JOINTS

## Constantly Increasing Track Maintenance Costs

REMEMBER—proper repair of old joints will postpone rebuilding miles of track for many years.

Wherever the rail itself has substantial life left in it, the joints can be eliminated and the track made good for years to come.

Isn't it worth a little more per mile to put existing track in A-1 condition for the smooth and quiet operation of cars? This is just as important as building new track.

Thermit welding does away with plates and bolts. It ends the need for rail bonds. In short, it makes a smooth, solid, unbroken connection where rail ends come together—a continuous piece of rail for miles and miles. It does not work loose. There's no more unsightly paving trouble around the spots where Thermit welds have taken the place of joints. There's no gap or break for wheels to jump, and therefore no further cupping or pounding to worry over.

## Maintenance Costs Almost to the Vanishing Point

# ING JOINTS

**After**

# These roads have done it!

Above we show a typical result of Thermit Welding an old joint. It happens to be in Fort Wayne, Ind., where hundreds of cupped joints like that shown on the first page have been eliminated by Thermit Welding.

At Park Row, New York City, the joints were Thermit Welded where the condition of the track under the heaviest kind of traffic had become apparently hopeless. Yet after Thermit-welding they got *eight more years of satisfactory service.*

In Pittsburgh, Milwaukee, San Antonio and many other cities the life of old track has been extended many years beyond what anyone dared hope for, by eliminating the joints with Thermit welds.

Ask to have our engineers inspect your track. Their report and estimate will interest you.

**METAL & THERMIT CORPORATION**

**120 Broadway, New York, N. Y.**

PITTSBURGH · CHICAGO · BOSTON · SOUTH SAN FRANCISCO · TORONTO

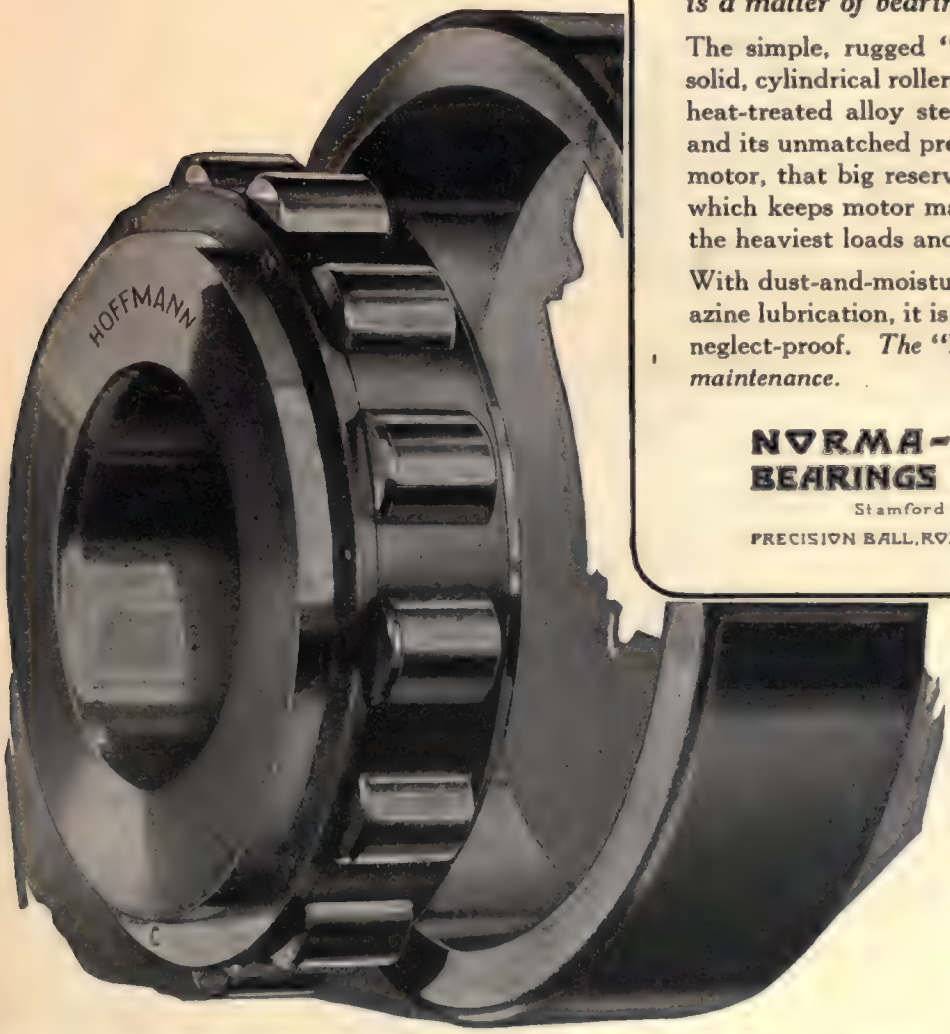
# More Mileage per Motor Bearing

A motor will stand what its bearings will stand—and no more. It will last as long as its bearing—and no longer. *Motor maintenance is a matter of bearing ability.*

The simple, rugged **"Hoffmann"**—with its big, solid, cylindrical rollers, its heavy races of hardened heat-treated alloy steel, its straight-line contacts, and its unmatched precision—affords, in a traction motor, that big reserve of strength and endurance which keeps motor maintenance down, even under the heaviest loads and hardest service.

With dust-and-moisture-proof mounting, and magazine lubrication, it is practically trouble-proof and neglect-proof. *The* **"Hoffmann"** *minimizes motor maintenance.*

**NORMA-HOFFMANN BEARINGS CORPORATION**
Stamford — Connecticut
PRECISION BALL, ROLLER AND THRUST BEARINGS




Our engineers will be glad to meet yours, and explain **"Hoffmann"** qualities in detail. Write for Catalog 904.

# "HOFFMANN"

## PRECISION ROLLER BEARINGS

# "I think Cincinn

# ati cars are fine"

"They stand up just as well as heavier cars. We operate 100% one-man service in the City of Dayton and we know that we can handle just as many people with Cincinnati one-man cars. . . . as with any car operated by two men. Our accident record is improving every year.

T. E. Howell, *General Manager,*
The City Railway Company, Dayton, O."

Enthusiastic approval has been voiced both by the operators and the riding public, wherever Cincinnati Lightweight NEW Cars have been placed in service.

The expressions quoted above are especially significant because they indicate two things.

First that BALANCED DESIGN *does* produce cars which are accurately fitted to the particular needs of the community they will serve.

Second that modern lightweight rolling stock, when built the way Cincinnati builds it, can easily handle the same or a greater volume of traffic, thus preserving *to the full* savings which it effects through lower power costs and one-man operation.

We will gladly discuss the details of this important subject with any interested electric railway executive.

CINCINNATI CAR COMPANY
CINCINNATI, OHIO

CINCINNATI *New* CARS

*A step ahead of the modern trend*

# American BROWN BOVERI

## CHIEF ADVANTAGES

(1) Efficiency high over the whole working range.

(2) Simple operation and minimum attention.

(3) No synchronizing.

(4) Very high momentary overload capacity and invensibility to short circuits.

(5) Negligible maintenance.

(6) Low weight. No special foundations.

(7) Noiseless and vibrationless operation, consequently rectifier substations can be erected in densely populated localities.

(8) New substations need only be of light construction. In many cases old houses can be converted, while the plant can often be erected in places that could not be considered for rotating machinery.

## Principal Products

*Mercury-Arc Power Rectifiers (steel enclosed)*
*Electric Locomotives—for any system of current, high or low tensions.*
*Complete equipment for railway electrification*
*Rotary Converters*
*Motor Generators*
*Complete equipment for outdoor and indoor substations*

*Diesel-Electric Locomotives*

*Automatic Regulators*

*Steam Turbo-Generators for normal or high pressures and superheats*

*Oil Switches and Circuit Breakers*

*Transformers*

*Turbo-Compressors and Blowers*

*Ships*
*Diesel Driven*
*Turbine Driven*
*Electrical Driven*

*Dredges and Harbor Equipment*

# Mercury-Arc Power Rectifiers

## *Negligible Maintenance*

Unlike rotary converters, there are none of the maintenance problems found in rotating machinery, except for the small vacuum pump which runs only intermittently.

The arc operates in a vacuum. There is no deterioration of the anodes or other internal mechanism. Absence of moving parts obviates frictional wear and tear.

Examination of the interior of American Brown Boveri Mercury-Arc Power Rectifiers, after many years of service, shows no depreciation.

*Bulletin No. 301, describing A-B-B Mercury-Arc Power Rectifiers is ready. We will be glad to send you a copy.*

American Brown Boveri Electric Corporation
165 Broadway, New York, N. Y. Camden, New Jersey
922 Witherspoon Bldg., Philadelphia. 842 Summer St., Boston 230 South Clark St., Chicago

MEMBER AERA 1927

# AMERICAN BROWN BOVERI

# HASKELITE *and help make*

Facts and figures compiled by Charles Gordon, Editor of the "Electric Railway Journal" demonstrate conclusively the increase in revenue and the decrease in operating costs actually experienced by electric railway companies as a result of adopting modern light weight cars.

Increases in revenue running up to 30% and more are found on individual properties and there is ample evidence of the ability of modernized rail equipment to meet the competition of buses and private automobiles.

An average saving of 22.5% in operating costs was made on 20 roads with approximately 50% of their equipment modernized. A saving of 40.2% was made on 5 roads with 100% modern equipment.

PLYWOOD
HASKELITE
PLYMETL

Car modernization produced a saving in every one of the five main subdivisions of operating costs. And in every one of these subdivisions the saving is greater for the roads with 100% new equipment than for those averaging 50% modern cars.

These figures are so convincing that every electric railway operator can well afford to give them careful study.

| Type of HASKELITE and PLYMETL and its Application in the Car. | Replaces | No. Sq. Ft. | Lbs. Wt. Saved. | Annual Saving in Oper. Cost at 6c. per Lb. |
|---|---|---|---|---|
| ½" HASKELITE Sub-Floor | ⅝" Fir | 240 | 200 | $12.00 |
| ⅛" HASKELITE Vestibule Facing | ¼" Cherry | 50 | 36 | 2.16 |
| ⅛" HASKELITE Truss Plank | ¼" Poplar | 50 | 15 | .90 |
| ⅛" HASKELITE Side Lining | ¼" Cherry | 60 | 18 | 1.08 |
| ⅛" HASKELITE Corner Panel | ¼" Cherry | 17 | 23 | 1.38 |
| ⅛" HASKELITE Bulkhead Finish | ¼" Poplar Boards T&G | 27 | 37 | 2.22 |
| ⅛" HASKELITE Roofing | ¼" Composition Board | 270 | 113 | 6.78 |
| ⅛" HASKELITE Headlining | ⅛" Poplar Boards | 270 | 65 | 3.90 |
| ¼" HASKELITE Hood | | 96 | 20 | 1.20 |
| ⅛" HASKELITE Seat Back | | 3 | ... | ..... |
| **Total saving through use of HASKELITE** | | | 527 | $31.62 |
| ¼" PLYMETL Letter Bd. (1 Face Metal) | No. 16 B&S Sheet Steel | 50 | 60 | 3.60 |
| PLYMETL Girder Plate | No. 12 B&S Steel Plate | 150 | 300 | 18.00 |
| PLYMETL Dash (1 Face Metal) | No. 16 B&S Sheet Steel | 34 | 40 | 2.40 |
| PLYMETL Inside Vestibule Lining | No. 20 B&S Sheet Steel | 36 | 8 | .48 |
| **Total saving through use of PLYMETL** | | ... | 408 | $24.48 |
| **Total saving through use of HASKELITE and PLYMETL** | | ... | 935 | $56.10 |

The most conservative estimate of the savings resulting from lightening the car bodies is the accepted figure of 6 cents annually per pound of weight. The total saving on the HASKELITE-PLYMETL car is 935 pounds.

## 935 lbs. at $0.06 totals $56.10 annually

## Are You Saving— or Losing—this much?

# PLYMETL
# modern cars Pay

HASKELITE and PLYMETL, when used in the car body, help make modern equipment pay both because they attract riders and because they offer minimum weight combined with maximum strength, rigidity and resistance to impact.

The noteworthy features of attractiveness in a HASKELITE-PLYMETL car are (1) the beautiful exterior made possible by the smooth-as-glass surface of the PLYMETL side panels, (2) the low step height resulting from the thin HASKELITE floor, (3) the de-luxe interior effect obtainable with HASKELITE natural wood linings and headlinings and (4) the ample head room made possible by HASKELITE roofs.

The saving in weight may run as high as 20 lbs. per unit of seating capacity. That's a big advantage in reducing power consumption wear and tear on the track, and wear on the car itself. HASKELITE roofs and PLYMETL side panels withstand tremendous blows without failure and in case of emergencies, repairs are made simply and quickly.

The best evidence that an investment in HASKELITE and PLYMETL is a profitable one is the fact that leading builders and operators throughout the country are specifying these structural plywood products in increasing quantity every year.

Let us send you a list of users and a blue print booklet showing the many applications to car and bus construction.

PLYWOOD
HASKELITE
PLYMETL

*One of the Grand Rapids cars utilizing HASKELITE roofs and interior linings and PLYMETL side panels.*

## HASKELITE MANUFACTURING CORPORATION

133 West Washington Street, Chicago

RAILWAY REPRESENTATIVES:

Economy Electric Devices Co., 37 W. Van Buren St., Chicago
Grayson Bros., 600 La Salle Bldg., St. Louis, Mo.
George E. Watts, 1523 Candler Bldg., Atlanta, Ga.
Railway & Power Engineering Corp., Toronto, Ont., Can.

ERJ3-19Gray

NEW YORK HERALD TRIBUNE, THURSDAY, JAN

# Comment in Wall Street

**Seminole Production Reaches New High**

The price situation in the Midcontinent field probably will remain [illegible] quo until there is a more violent change in the production of the [illegible]. Although the output of this pool, which continues to be [illegible] of Midcontinent's price outlook, recently estab[illegible] present prices [illegible] storage. The amount going into storage tanks is no greater than normal for this time of year, and unless there is a violent upswing in the production at Seminole City, there probably will be no change in the present price structure.

**December Rail Earnings May Improve**

A majority of railroad earnings statements so far received show that there was a substantial decrease in both net and gross during last month compared with December, 1925. The coal roads have proven the exceptions so far, and while the outlook based on the figures so far received promises a total lower than for December, 1925, it should be remembered that these early reports are only a few of the figures. As the [illegible] reports are reported on succeeding days it may be [illegible] that the earlier disappointments may be more than offset and [illegible] that the figures yet to be reported will establish new high [illegible] aggregate may be a bit higher than in December, 1925. Figures [illegible] full twelve months reflect the prosperity of the carriers during [illegible] and many of the figures yet to be reported will establish new high [illegible].

**Comfortable Trolleys Prove Successful**

First proof of the feasibility of furnishing comfort as well as utility in street railway transportation is shown in the 1926 report of the Grand Rapids Railway Company, which last June installed on its lines a new and revolutionary type of trolley car. The new cars, with streamline bodies, "bucket" seats, rubber flooring, smoking compartments, automobile lights and bumpers, were such a departure that they were immediately called internationally the "Grand Rapids type." Operating results show the wisdom of the innovation. During the period June to November, passenger revenue gained 2.51 per cent on these lines and expenses decreased $45,170. In the hard uphill fight to rehabilitate street railway companies the most progressive executives are realizing that among the most important necessities are those of providing comfortable cars such as the motoring public is accustomed to, decreasing operating expenditures, and maintaining regular, speedy schedules.

**Merger Opposition Becomes Customary**

Whenever a company is going through financial reorganization or [illegible] plans are made for the merger or consolidation of a number of companies into a large organization opposition is almost invariably encountered. The opposition comes from certain minority security holders. Sometimes the opposition [illegible] from bondholders who do not think they will get enough for their bonds, but usually the objectors are owners of stock. The two [illegible] and outstanding instances of how such opposition and the [illegible] of plans are the St. Paul reorganization and the Nickel Plate merger. A bondholders' committee has been fighting the St. Paul reorganization [illegible] and a stockholders' committee has been fighting the Nickel Plate merger. Managers of reorganization [illegible] in almost every instance when seems for the exchange of securities in a new organization are proposed.

**Cancellations to Cut Mexican Oil Output**

Wholesale cancellations of drilling permits by the Mexican government should chiefly be reflected in a lower output of oil in that country and consequently lower taxes to the government. The total of 14[illegible] permits revoked, including twenty-five drilling wells, [illegible] operations [illegible] started before the first of this year, still leaves the country with a large number of producing wells. If no new wells are brought in it is [illegible] that there will be a sharp curtailment in the Mexican [illegible] production. Probably about half of the Mexican output would [illegible] of [illegible] taxes, and a duplication of output would [illegible] the burdensome to the Mexican authorities.

**Gasoline Price Raised**

The Standard Oil Company of New York yesterday advanced the price of [illegible] cents a gallon, [illegible] a gallon. The [illegible] was not followed by the Texas Company.

**Market Averages**

WEDNESDAY, JANUARY 26, 1927

**Money and Credit**

WEDNESDAY, JANUARY 26, 1927

CALL LOANS

TIME LOANS

COMMERCIAL PAPER

COMPOSITE AVERAGE OF STOCKS

COMPOSITE AVERAGE OF BONDS

A Tower of Strength

# Capital is interested in these figures

TWO MAIN FACTORS—management and the balance sheet—in the electric railway industry as in any other—determine the extent to which financial support can be expected. And progressive managements realize that modern equipment helps to win the confidence of the investing public.

Modernization programs—Replacements with new light-weight modern cars of heavy, obsolete equipment, are resulting in increased revenue which attract the attention of the financial world.

Wall Street measures success in terms of increased revenue and decreased operating expenses. Grand Rapids, with its 27 new, modern, Quality St. Louis cars has during its first six months since modernization gained 2.51% in revenue and reduced expenses $45,170. Wall Street is quick to say, "Comfortable trolleys prove successful."

*Capital is interested in such figures!*

And Grand Rapids is but an index finger pointing to the financial support you, too, may expect when you follow through on a program of progressive modernization.

***built by***

**St. Louis Car Co.**

Quality Cars

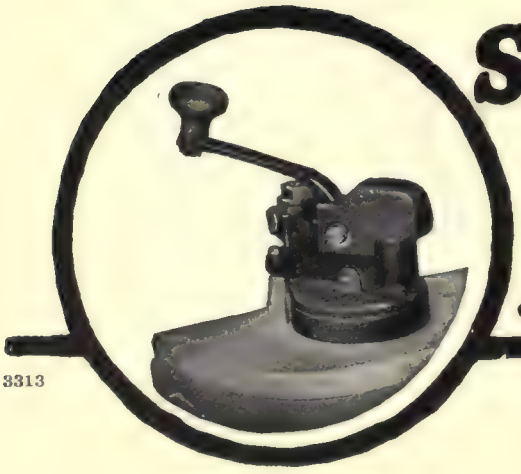
# Atlanta is Modernized with Safety Cars

THE Georgia Power Company, operating within the city of Atlanta and environs, has, by its deliberate steps in Safety Car installation, taken its place among the leading traction properties of the country.

Over one hundred Safety Cars are now serving Atlanta and future prospects of an even more intensive service are brightened by the fact that a process of modernizing old equipment with Safety Car Devices is steadily being effected.

The better service, through Safety Car installation in Atlanta, has stimulated public satisfaction, which means increased patronage, and in the end a substantial economic gain.

*We make the equipment which makes the Safety Car.*



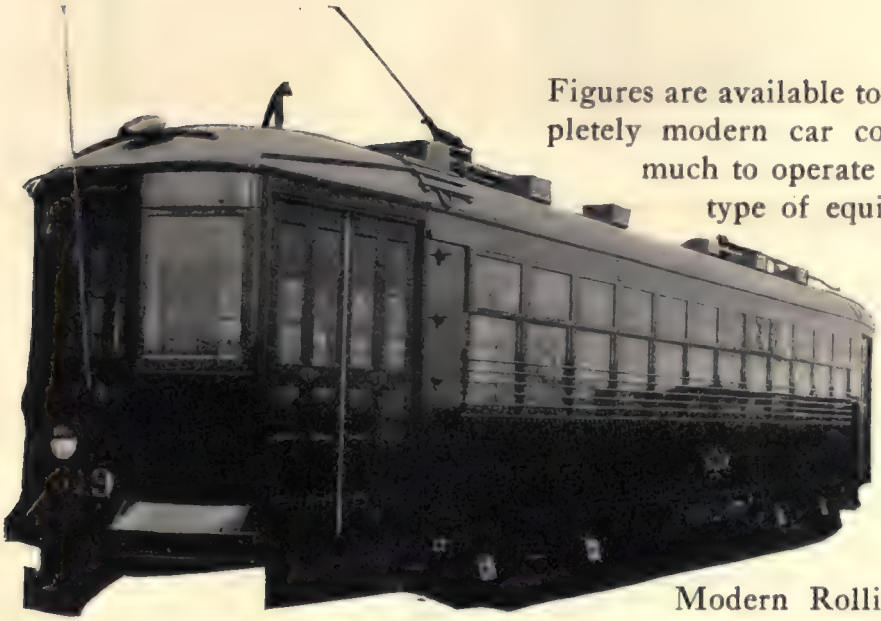
**SAFETY CAR DEVICES CO.**
**OF ST. LOUIS, MO.**

*Postal and Telegraphic Address:*
**WILMERDING, PA.**

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

3313

# Cheaper to Buy New *than Rebuild Old*



Figures are available to show that the completely modern car costs only 77.5% as much to operate as the older, heavy type of equipment.

Modern Rolling Stock pays for itself. Figures which cannot be ignored, have been obtained which prove it. More inviting in appearance, more comfortable to ride in, making faster trips and shorter stops; the modern car creates increased patronage and reduces the competition of the private automobile.

Lighter and faster, it operates at low cost, and entails reduced maintenance expense.

Revenues are thus increased by larger receipts and by lessened expense. The combination has been shown on properties using new cars built by this company, to be effective in wiping out the cost of the new equipment in a very few years.

## Cummings Car and Coach Co.

*Successors to McGuire-Cummings Mfg. Co.*

111 W. Monroe Street
Chicago, Illinois

Light Weight City and
Interurban Cars
Single and Double Trucks

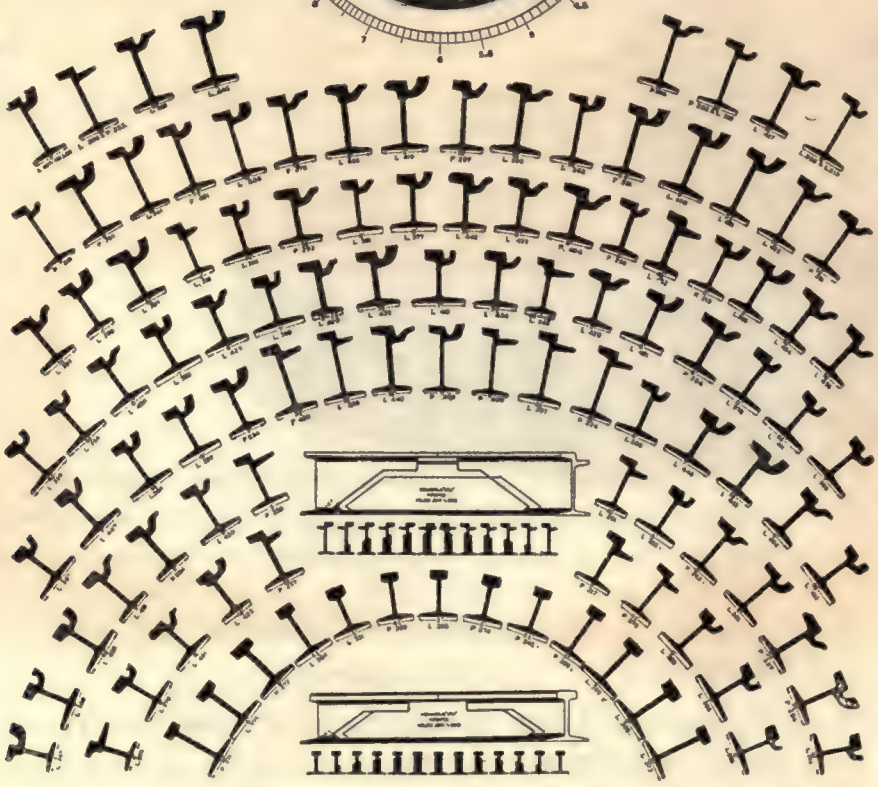
*and—*

*the Cummings Gas-Electric Motor Coach*

# ROLLER-SMITH Bond Testers for ANY rail-head, EVERY rail-head

Bar in place on "T" Rail showing Saw Blade Contact

Bar in place on "Girder" Rail showing Saw Blade Contact



*(Courtesy Indianapolis Switch & Frog Co.)*

## Practical and efficient bar contacts

Equipped with saw-tooth contacts which "bite" into any rail-head, the ROLLER-SMITH Bond Tester makes short and easy work of this important maintenance problem. The two types of contacts supplied are illustrated herewith.

ROLLER-SMITH Bond Testers are small, compact, light, and simple to operate and direct reading in units of feet of rail. One man can handle this equipment with ease.

*Send for Bulletin G-200*

*"Over thirty years' experience is back of ROLLER-SMITH"*

**ROLLER-SMITH COMPANY**

**Electrical Measuring and Protective Apparatus**

*Main Office:* 2140 Woolworth Bldg. NEW YORK

*Works:* Bethlehem, Penna.

*Offices in principal cities in U. S. A. and Canada.*

*Representatives in Australia, Cuba and Japan.*

ROLLER-SMITH COMPANY, 2140 BROADWAY, NEW YORK CITY

GENTLEMEN:

Please send me ROLLER-SMITH Bulletin G-200.

Name.....

Company.....

Position.....

Address.....

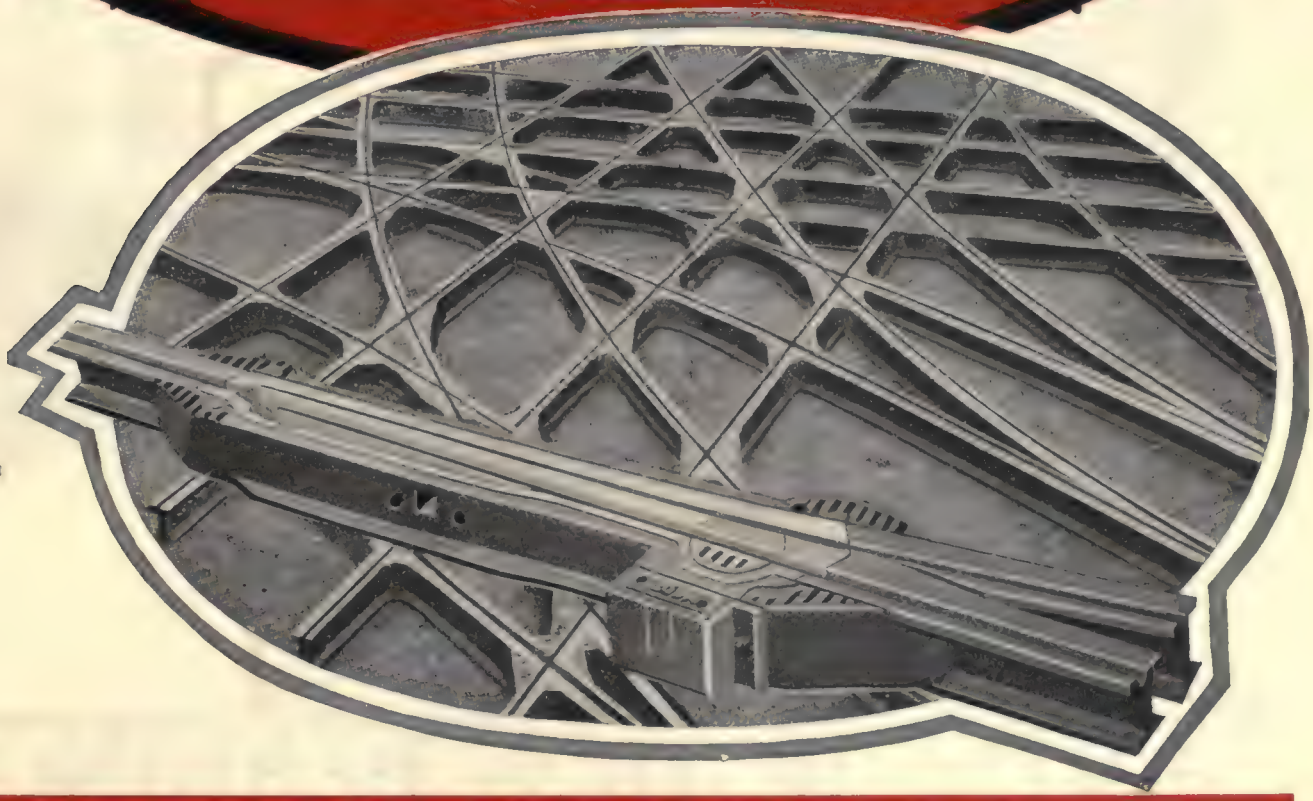
City.....State.....

THE test of quality in trackwork and equipment is service. For forty-five years, Buda trackwork and equipment has been meeting this test—and is meeting it today. Buda is always an assurance of quality and service.

Send us your inquiries today.

THE BUDA COMPANY
HARVEY (Chicago, Suburb) ILL.

BUDA
ESTABLISHED
1881



# For the Big The SKF

## FACTS!

**SKF Spherical Bearing on Railway Journals**

1. The SKF Spherical Bearing was the first successful anti-friction bearing to be used in the journals of a standard American railroad passenger coach. That was in 1921.

2. A number of standard American railway cars, equipped with SKF Spherical Bearings, have covered *more than one-half million miles* without bearing adjustment and with the bearings showing no appreciable signs of wear.

3. SKF Spherical Bearings are in use today on more than seven thousand standard railway passenger cars, cafe cars, diners and auxiliary railway equipment throughout the world.

* * *

**The performance of this bearing in heavy railway work over a long period of years is the thing which is responsible for the present interest in anti-friction bearings on railway journals.**

© 1927

# ANTI-FRICTION BEARINGS

# BRUTE Jobs of Industry
# SPHERICAL BEARING

HERE is an anti-friction bearing that was MADE to do the big jobs of industry—the heavy jobs—the brute jobs.

On the great bulking monsters that grind the pulpwood that gives us our daily newspapers.

On the giant crushing rollers in flour mills. On rock crushers, coal crushers—on ALL Jobs that demand rugged, unfailing performance under the severest service conditions that a bearing can be called upon to meet—

These are the jobs on which this SKF Spherical Bearing has been functioning for years—the jobs on which its stamina, its ability to take punishment have been proved!

The SKF Spherical Bearing is not a new bearing. SKF would not endorse it if it was. It is time-tested. It has been used for years in the journals of standard American railway passenger coaches. The railway journal application of anti-friction bearings considered, at one time, the supreme test of bearing stamina is far from representing the maximum of punishment that this bearing will take.

But, lately, industry has discovered in this bearing qualities that no other anti-friction bearing possesses.

It is the only heavy-duty roller bearing that approaches the anti-friction qualities of the ball bearing.

It is practically the only roller bearing ever produced for combined radial and thrust load that is made as well as a ball bearing is made, from the standpoint of materials, workmanship and finish.

And, so, SKF offers this bearing to industry for any job that is worthy of its steel—for the big job—the brute job. For, this bearing, alone, has proved that it could *stand up* not in the laboratory, not on paper, but through years of actual gruelling service under conditions that caused all other bearings to fall down.

Your bearing problem may require the SKF Spherical Bearing—or it may demand a bearing of an entirely different type. Whatever your problem is, put it up to SKF with the assurance that you will receive unbiased bearing counsel. For SKF makes an anti-friction bearing for every need known to industry.

# SKF

*More than 100 factory offices throughout the world*

SKF Puts the Right Bearing in the Right Place

SKF INDUSTRIES, INC. - NEW YORK CITY

1781

# FOR EVERY PURPOSE

*Clark Street, Chicago, Between Randolph and Washington, 1887.*


# Compare This Scene With That of Today!

The calm, leisurely days of a few decades ago! ... No unbroken procession of automobiles, no thundering motor trucks, no hurrying dashing crowds.

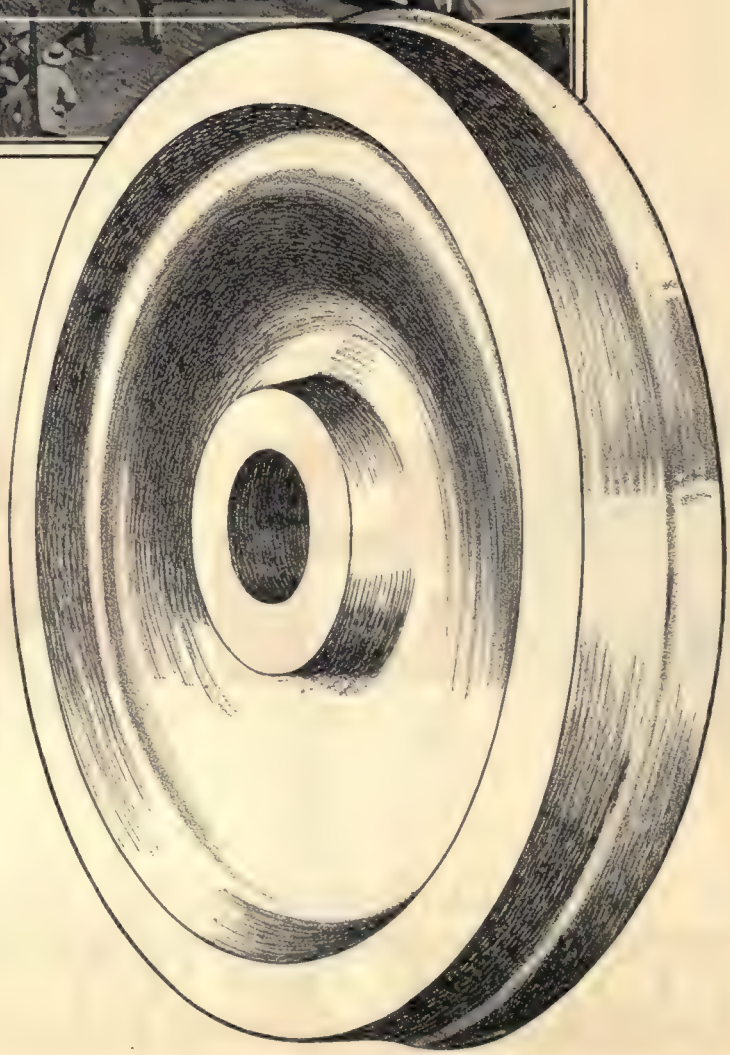
Contrast this scene with that of today: Peak periods, rush hours, stringent schedules; quick starting, sudden stopping, frequent recurrence of emergencies.

Yes, traffic conditions have changed ... and the Gary Wrought Steel Wheel has kept pace with the change.

Our wheel engineers are at your command.

**Illinois Steel Company**

General Offices:
208 South La Salle Street
Chicago, Illinois

# Maintaining *the* Standard

this must be the constant concern of the successful merchant *especially when his "stock-in-trade" is transportation!*

# Modernization has set
## *it remains for progressive*

General Electric has materially aided many properties to establish modern maintenance practice and so to promote public good will. The resources of the entire G-E organization are available to assist operators in setting up a consistently profitable standard of service.

WHEN the industry took its cue from the trend of the times and indorsed the idea of modernization, a new standard was established.

With its acceptance, operators have come to realize their concurrent responsibility for maintenance. Half the value of new cars, as revenue producers, lies in their very newness; the other half, in their economy of operation. Both of these must depreciate rapidly if maintenance is not as modern as the equipment itself.

The subject is of grave importance to every executive and operating man in the industry. It concerns very closely the future success of the work which has been so well begun.

# GENERAL

# the pace
# *maintenance to keep in step!*

Here are examples of G-E railway devices and supply parts which are helping progressive maintenance men to keep costs down and cars running.

The new G-E Hinged-type Controller Finger is substantial and strong. It will not bend or buckle, a characteristic which cannot be over-emphasized. Its design permits alignment of the tip with the segment so as to assure full width contact.

"G-E Line Breaker Equipment with improved LB Controller Handle materially reduces controller maintenance and expedites operation." This report comes from the New Orleans Public Service, Inc.

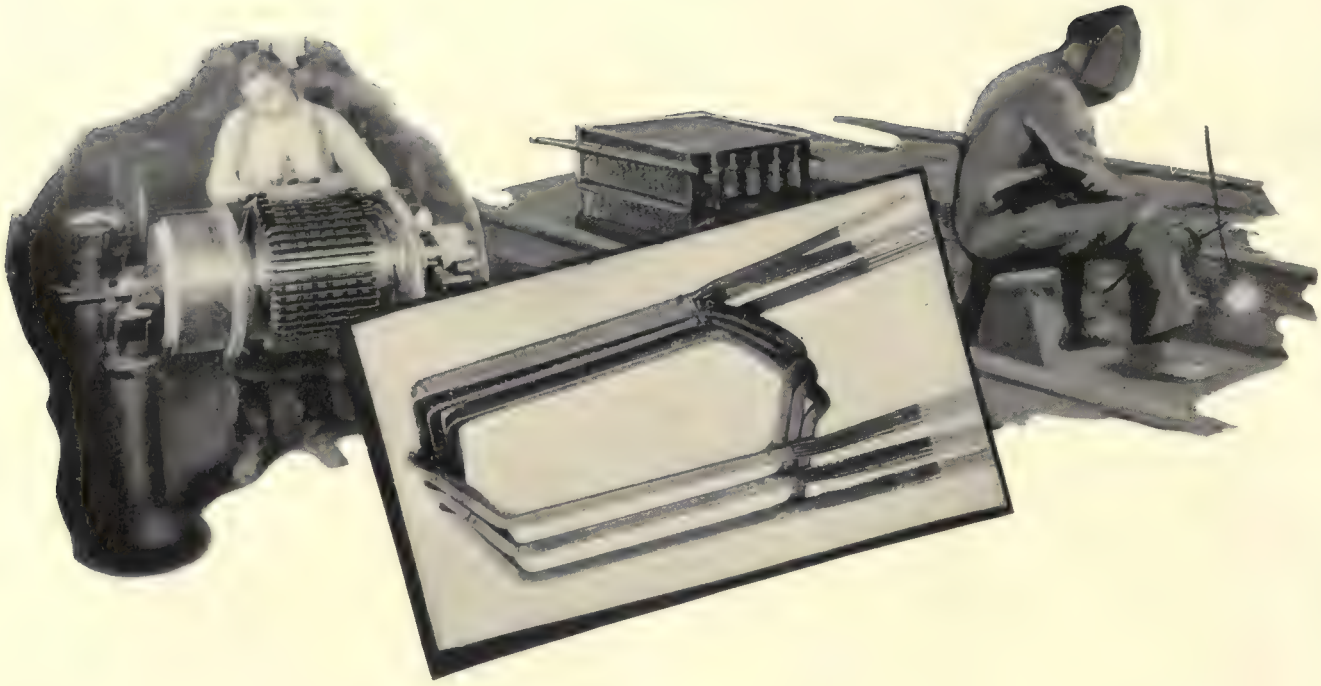
G-E Renewable Carbonway Brush Holders reduce maintenance costs 80% by making it unnecessary to replace the most costly part of the holder.

The General Electric D-C Aluminum Lightning Arrester has an established reputation for providing absolute protection. The new improved G-E arrester has three cells instead of two, yet it occupies no more space.

G-E Armature Coils have the slot portions moulded to exact dimensions. The size of the insulation assures a perfect fit, and so eliminates rubbing and wear.

G-E Automatic Sectionalizing Switches are used on scores of properties as a means of saving feeder copper and improving feeder distribution.

# ELECTRIC



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# Replace
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# GENERAL ELECTRIC

Annual Maintenance and Construction Number

# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

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CHARLES GORDON, *Editor*

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## *Maintenance from the Car Rider's Viewpoint*

WHAT concern of the car rider is the maintenance practice of his street car line? What does he care about the workings of the motors, the trolley, the track? Why worry whether the car that carries him is a light-weight type or a heavy one? Certainly if the rider pays any particular attention to these things he is different from the average man. But when he decides whether to ride the street cars or to buy a new flivver, he considers, even without realizing it, that perhaps the cars are habitually dirty; that there have been frequent delays because of road failures; that the flat wheels have left him tired at the end of a half-hour ride; that the lights flicker so that he cannot read the evening paper. Perhaps his wife tore a new dress because a nail protruded from the car seat, or a spot of oil from a door engine dropped on his new fedora as he left the car on the way to the theater. These are the possibilities to indicate how the car rider is affected by the maintenance of the system.

Let the maintenance man put himself in the position of the man who is to be attracted or repelled. Let him determine if he would ride the cars if he had to pay fare. Then have him go back to his job and try to put his part of the system in such good condition that the average citizen will be pleased to become a regular rider. That is maintenance from the car rider's viewpoint.

*Well-maintained rolling stock reflects the company's own estimate of itself.*

## *Smooth, Quiet Operation Results from Good Workmanship*

EVERY ONE realizes that quiet running cars are needed and that a high standard of maintenance is necessary to do away with excessive noise. Campaigns for noise reduction are producing good results, and the various maintenance departments show an alertness and eagerness along this line never before manifested.

Better maintenance will permit smoother operation and make it easier to maintain schedules. An open-circuited resistor or a governor out of adjustment may cause jerky acceleration and annoying stops. The passenger usually blames the operator for this, but the real reason is poor maintenance.

The men responsible for the condition of electric railway equipment are really the foundation that must support any campaign for improved equipment. Success in attracting riders and keeping them satisfied depends on the efficiency of the maintenance departments. All other sales effort and publicity to produce increased patronage will fail if cars are dirty and ill-kept, if the track is rough and out of alignment, or if trolley wire breaks and wheels off the wire cause annoying interruptions to service.

*Avoid the folly of the broken trolley—inspect the overhead before it gets under foot.*

## *Care Is Important for the Electrical System*

NO PART of an electric railway is more vital than the electrical system. Practically 100 per cent service is an absolute essential. Other parts may fail, causing local delays or inconvenience, but breakdown of the electrical system may easily affect a large territory, so that extraordinary efforts should be and are constantly made to prevent failure.

The generation of power is no longer a matter of direct concern to many railways. Its purchase, frequently from large interconnected systems of such diverse territory that failure of the primary source of power is infrequent, is supplanting generation for railway purposes alone. Increased reliability in the substation has been secured by improvements in conversion equipment, particularly for use on 60-cycle systems, while the tendency toward simplification and increased efficiency by use of the mercury arc rectifier is receiving careful consideration.

Development of automatic protective apparatus for use in the substation and on the line has not only reduced the time required for the isolation of overloaded or defective sections and decreased the probability of interruption of other than the affected circuit, but has provided for the automatic restoration of service at the instant that conditions become normal. Remote supervisory control has made it possible for the load dispatcher at a central point to keep in continuous touch with the entire system and to perform necessary switching operations in distant unattended stations with greater facility and certainty than was formerly possible with operators at each place.

The transmission, distribution and trolley contact lines have also received consideration. Insulating materials are constantly being improved, and the results of intensive research are being applied to the insulation of cables for high voltages. The trolley wire material, its manufacture and use are all being carefully studied in the desire to secure a more perfect electrical system.

Unfortunately not all electric railways have modern equipment throughout, though the electrical system may include some or all of the features previously mentioned. In all cases, however, there are two requisites for satisfactory service, namely, thorough inspection and

judicious maintenance. Good construction alone is not enough. There must be periodic and thorough inspection to eliminate possible sources of delay before a breakdown actually occurs. In many instances inspection must be supplemented by tests, to determine conditions accurately. The frequency with which inspection and tests are necessary varies for different parts of the system. Some require daily attention, others need it less frequently; but regularity is essential.

Incoming material should be closely watched so that its acceptability and quality are known before installation. The scrap pile cannot be overlooked for ideas, as an inspection of worn-out parts often points the way to improvements.

The importance of thorough inspection combined with judicious maintenance cannot be overestimated. Worn materials must be replaced before failure, but economy dictates the necessity of getting all possible wear before replacement. To secure a proper balance between these two conflicting requirements makes necessary the use of good judgment all along the line, by the superintendent, by the inspector and by the foreman and workmen directly responsible for the maintenance of the system.

*The repair job that is "cheap" is not the least expensive in the long run.*

## Preventive Maintenance Is Better than Repairs After Failure

MAINTENANCE of the highest type includes cars well painted, which are kept immaculately clean, with no loose parts to cause disagreeable noises, and lubricated so that smooth running results. For a short period such maintenance will cost more per car-mile than slipshod work, but in the long run, considering both maintenance and depreciation of the equipment, it will be the cheaper. From the revenue viewpoint the better maintained car certainly will attract more riders and the increased earning power will more than pay for the high standard of maintenance.

Most car maintenance work can be classified under five general headings. These are (1) work needed to keep the car clean, attractive and noiseless; (2) inspection and adjustment; (3) repairs and replacements of worn parts to anticipate and forestall failure; (4) repair of failures; (5) repairs to equipment damaged in operation.

The far-reaching influence of the first class of maintenance, that necessary to keep the equipment attractive, is often overlooked. Many master mechanics know that when it appears advisable to reduce maintenance expense, this class of work is the first one in the budget to be cut, as officials consider that the cars will still operate satisfactorily even though their appearance is not of the high class desired.

The items of car cleaning, painting and lubrication represent a relatively small part of maintenance costs and the savings from neglecting any of these will be comparatively small. It certainly does not pay to cut down expenditures for these three items. In analyzing average figures for several large railway systems, it was found that car cleaning constitutes approximately 15 per cent of the total maintenance cost. Car painting, done on a yearly basis, was approximately 12 per cent of the total and the cost of both labor and material for lubrication was less than 3 per cent of the total. The systems included in the analysis pride themselves particularly on having attractive cars, but still the total expenditure for the three items enumerated is less than one-third of total maintenance cost.

*Why give the passenger a soft seat and trust him to a rough motorman?*

## Cutting Costs at the Source

NO PROGRAM of maintenance-cost reduction can be fully or even largely successful unless the co-operation of the working force can be secured. This co-operation is necessary for conservation of materials, and even more for conservation of time. It involves two elements; desire to keep down maintenance costs, and knowledge of the equipment and its use far beyond the range of the particular job. It appears therefore that here is a problem of management which for its solution involves education. First comes education in loyalty and co-operation; on this a superstructure of information can be reared.

Maintenance costs can be most effectively minimized by careful, that is, intelligent, handling of equipment. This is especially needed, for example, with the modern, light-weight, ventilated motor. A manufacturer's expert, called in for consultation in connection with an epidemic of motor failures, soon correctly diagnosed the trouble as due to frequent and unnecessary reversal of motors in braking. A campaign of education stopped the trouble. Similarly, motormen sometimes "fan" the control so as to "inch the car along" when following another car or other vehicle.

These illustrations suggest but one of many ways in which maintenance can be made to approach the irreducible minimum, that is the amount which is involved in unpreventable wear-and-tear. Then in the actual maintenance work there are other opportunities. First, because most obvious, is elimination of waste in the use of materials. Reclamation of worn equipment and other parts is responsible for large economies and has still further possibilities; always, however, understanding that repair work can be carried too far. To a limited extent also there is actual loss or misuse of material; this can be obviated with a little care.

Important as materials conservation is, however, time conservation is still more important. Labor loss is the more subtle, more difficult to discern and measure—and yet labor is the largest part of maintenance cost. Good supervision will control this loss to some extent, but without the will to save and knowledge of how to do it the worker will waste time, inadvertently or otherwise.

No magic formula can be invoked. But an overwhelming majority of electric railway workers want to help the management cut maintenance costs. They positively will welcome information and suggestions. They want to be taken into partnership in performing this task of management. Much can be done along the line of education through departmental conferences, and where a railway has a comprehensive educational and training program in operation, cutting maintenance costs may well be one objective in laying out the courses. Competition is also an incentive; such, for example, as is furnished by the increasingly popular interchange of maintenance cost data among properties. The first requisite in all of this, however, is a conviction on the

part of somebody that the worker is the ultimate source of considerable maintenance cost, hence offers an opportunity for stopping certain leaks at their source.

*Paint your rolling stock or you won't need any rolling stock to paint.*

## Paint Artistically If Possible, but Paint Anyway!

SIR JOSHUA REYNOLDS' famous remark to one of his questioners that he mixed his paint with brains is one that the electric railways may well ponder. Many of them are doing this very thing, but some of them are not. Ordinary pigments include, among others, umbers, siennas, ochres, chromes, Venetian red, Indian red, Prussian blue, and Vandyke brown, but it is the combination of colors that counts. Thus it may seem a long jump from Pliny explaining the term "catagrapha" and Epictetus decorating a vase to the modern car painter, but to both of them the vehicle is still the liquid in which the particles of the base are held in suspension. Age may stale only slightly the infinite variety of the subject of the master, but age and abrasions do detract from the work of the master car painter. The true artist may wince at a combination of yellow and bright red, but these colors make for visibility.

The slatternly-looking vehicle certainly has no place in the present scheme of things. And in eradicating it, paint can be made to play an important part. This is so because the modern methods of painting have made it possible. Isn't it significant that on one railway system the cost of repainting a double-truck car at the present time is $69 with labor at 58 cents an hour —a cost considerably lower than that of 1913, although labor and materials doubled in cost meanwhile? Isn't it also significant that on another system, by improved methods, the number of revenue cars painted annually has been increased from 34 per cent of the total operated in 1920 to 82 per cent in 1925, while the man-hours required for painting a 40-ft. double-truck car have been cut from 340 in 1920, with hand labor, to 90.9 in 1925 with spray and hand labor?

The answer, it seems, is not in the economy itself, but in the opportunity which that economy affords for more work of the same kind to be done at the same gross expenditure. But no matter what the cost, it is the color combination that counts. And there again the advice of Sir Joshua holds good. The tangerine that would do in one place might not do at all in another. Of course, the taste of the public cannot be trusted implicitly, but the railways in Atlanta and Kansas City appear to have fared well by permitting their public to express its ideas about the matter. The members of an art institute might not approve of looking upon traffic, made up for a goodly part of street cars, when they are bright red. This would seem to be just as well. The flaming interurban that can be heard a mile away, to put the matter in the vernacular, may be all right when isolated, as it usually is, but a multitude of such cars on a city system would be more than sensitive souls could endure. A maroon that is permitted to become a screaming scarlet would probably not receive acclaim at the hands of the art critics. It is all a matter of taste, durability and cost, and not the least important of these is the esthetic side of the matter. Of that it might be said *fiat lux.*

## Interurban Stations Often a Poor Advertisement

WHAT a dismal picture some interurban stations present! A two-by-four shack, open on one side; a dirt floor and rotting sills that struggle to keep the cinder ballast from washing away. Look at the walls. They are the victims of every pocket-knife owner, and what is far worse, those traveling Michelangelos with a flair for the obscene and lewd. Often they are the last resting place for the dodger of a Fourth of July excursion which raises the ire of the commuter when snow is a foot or two deep outside.

Turn the mental film and view a terminal station of the average interurban. Often it is a reconstructed building. It is poorly lighted, furnished with hard benches, its toilets are unsanitary, cuspidors of the iron age adorn its smoking rooms, it is cleaned with a lick and a promise. It is cold in winter and hot in summer. It is a sardonic joke on the company's publicity claims.

Yet the wayside station and the terminal building are the gateways to the utility—the portals to service, that no matter how well advertised or maintained, suffers immeasurably by their unkempt appearance. Poorly maintained way stations are often the point of the wedge for community antagonism. They are monuments of indifference to what the public considers essential to its comfort. Ten minutes in a leaky, unkempt way station has bred many a bitter enemy.

*There is a certain likeness between an attractive street car running on bad track and a Rolls-Royce running on a flat.*

## Many Station Improvements Can Be Made at Little Cost

ON THE other hand, let's square off and look at the whole problem of the possibilities available for interurban station improvement in the light of a few simple maintenance kinks. That the way structure be adequately protected and habitable in all kinds of weather is the first consideration. This and cleanliness can be easily effected by rigid inspection by the track foremen. Next comes a neatly ballasted platform, a little whitewash on the sills, renewal of old sills with ties or bridge timber that ordinarily would be burned or piled in the storage yard. Add a few buckets of paint. Then offer a small prize and half the problem has been solved.

Next it may be observed that flower seeds are cheap and vine seeds are cheaper. A flower box with a few hardy plants or a vine is living publicity of the best sort. Or better still, a small flower plot arranged in an emblematic fashion with a slogan of the road, spelled with flowers. Fix to the wall a neat publicity board, the messages on which are frequently changed, and then by reason of the new ensemble sit back and watch how the wind shifts. No station is so isolated but some adaptation of this scheme is not practical. More often the rule than the exception, the community that is served will furnish the protective measures and, more than likely, some of the maintenance effort necessary to make the portal a show place. With such a decorative setting the station becomes not only the portal to the company's service but a gateway to the community of which every citizen will be proud. Make these silent sentinels monuments to the progressive principles of the industry. Silence is golden if the gold is there.

# Daily Cleaning Keeps Cars Bright

No. 1. Ventilator sides and sign windows are wiped carefully with cheesecloth.

No. 2. Applying soap suds and scrubbing cleans all parts.

No. 3. After scrubbing, the cars are rinsed carefully with a special brush and are then squeegeed to remove all streaks.

No. 4. Two types of scrubbing brushes are commonly used. A small furniture brush reaches corners and inaccessible places.

No. 5. Wetting down the exterior of a car is the first operation in the general cleaning.

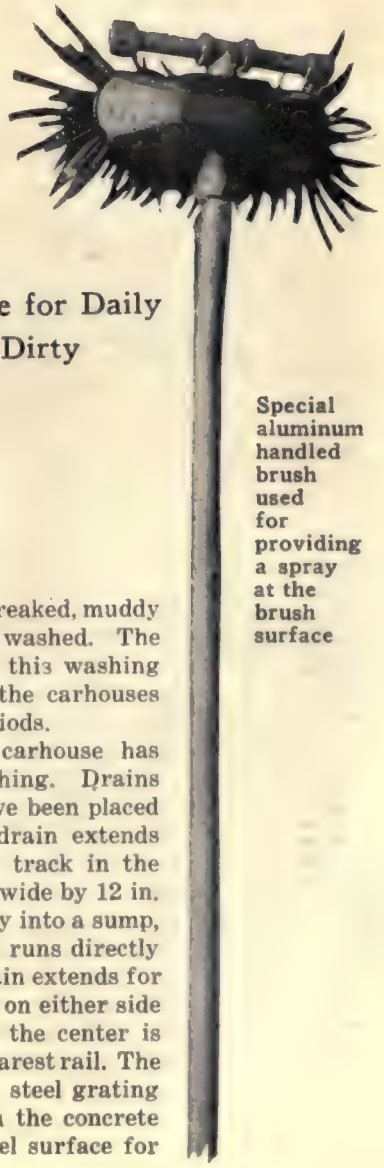
Giving a car its daily washing as it is brought into the carhouse

# Clean Cars

## Hold Patronage

### Methods of the Third Avenue Railway, New York City, Provide for Daily Washing of Car Exteriors When These Become Spotted or Dirty from Traffic or Weather Conditions

**By J. S. McWhirter**
Superintendent of Equipment Third Avenue Railway System, New York, N. Y.

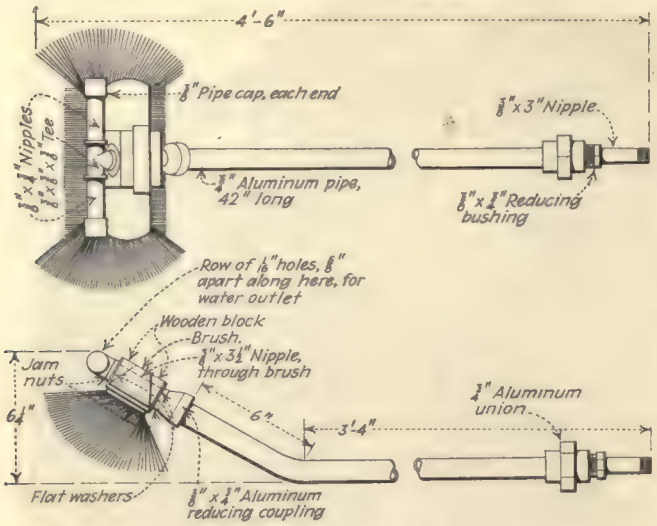


Special aluminum handled brush used for providing a spray at the brush surface

SPECIAL provision has been made so that cars can be cleaned frequently on the lines of the Third Avenue Railway System, New York City, in order to keep the company's rolling stock in the most attractive condition possible and also to prevent deterioration. Much of the track of this company is under elevated railway structures, where, during rainstorms or in the winter, there is dripping from the structure onto the cars. Even when there is no actual rain the windows and sides of the cars get a muddy appearance which is most undesirable. Also, during the summer considerable dirt and iron rust from the structure fall to the roofs of passing cars. Whenever there is a rainstorm, this washes from the roof down on the sides and the windows and produces a streaked appearance.

In order to provide for frequent cleaning, each carhouse has been equipped with a washing system. Cars are washed daily if conditions warrant. When there is a rainstorm or when cars begin returning to the carhouse dirty or with a streaked, muddy appearance all cars are washed. The usual practice is to do this washing as the cars return to the carhouses after the peak-load periods.

One track at each carhouse has been equipped for washing. Drains and a concrete floor have been placed in this section. The drain extends along each side of the track in the form of a trough 10 in. wide by 12 in. deep and sloped to empty into a sump, from which a 3-in. pipe runs directly into the sewer. The drain extends for a length of about 50 ft. on either side of the wash track and the center is about 2 ft. outside the nearest rail. The drain is covered with a steel grating whose top is flush with the concrete floor, thus giving a level surface for




Construction used for special aluminum handled brush

the men who do the washing as well as making the floor look neat.

At each location are four hose connections to the city water system so that four men can work at the same time. In an accompanying illustration, which shows the washing track at the West Farms carhouse, two of the water connections are alongside the shop wall, since the wash track is the first from the wall. The other two water connections, which come between tracks, are in the floor. These have removable covers for making the hose connection which can be replaced with the hose passing through a hole in the cover. Each hose has a length of 50 ft. so that all parts of the outside of the car can be reached readily. Ordinarily with four men a 43-ft. city car can be washed in 1¼ minutes. Where cars do not come in at such a rapid rate two men can do the washing in about 2½ minutes per car.

A convenient brush for the washing is used which has a special construction with a pipe connection over the top to provide a spray of water at city pressure. The brush handle is made of ¾-in. aluminum pipe and is 42 in. long. The lower end is provided with an aluminum union and a nipple for attachment of the hose. The upper end passes through the brush and then has a T-shaped connection of ⅜-in. aluminum pipe 10 in. long just at the upper face of the brush, with a row of 1/16-in. holes spaced ⅝ in. apart along the side next to the brush. The water is forced out of these holes with considerable pressure and passes along the front side and into the brush. The spray of water itself is very effective for removing dirt and the rubbing of the brush, which also keeps filled with water, will remove any hard particles. The brush used is a No. H-701, manufactured by the Whiting Adams Company, New York, N. Y. An accompanying drawing shows the method of fastening the brush to the handle and the provisions for spraying the water and attaching the hose. The aluminum pipe is very light and lessens the fatigue of the workmen.

With four men washing a car, two start at one vestibule corner and work in opposite directions. The other two start at the diagonally opposite corner and work toward the first two. Each man wears a rubber coat, boots, hat and gloves.

All parts of cars in service are cleaned thoroughly and are scrubbed once each month. The wash room at the West Farms carhouse, which is typical, is provided with three tracks and is 30 ft. wide by about 60 ft. long. The floors are of concrete and are sloped to sumps for drainage, so that the water runs directly into the sewer.

To provide for efficient washing of cars during cold weather, the wash room is heated by a blower system. Air is heated over steam pipes in the boiler room and then blown through ducts. A 16-in. diameter pipe runs from the blower underground and from this risers are provided, each 10 in. x 20 in. The washing room has four outlets. The equipment and methods used are shown in accompanying illustrations.

For the general monthly cleaning the five men assigned to the work at the West Farms carhouse average thirteen or fourteen cars daily. One works inside rubbing off moldings, etc., with cheesecloth, one cleans the vestibules, two scrub and wash the outsides and one uses a squeegee, after rinsing. The brushes with the special aluminum handle and attachment for spraying the water are used advantageously in this general cleaning.

In cleaning the outside of the car all parts are first wet down by means of the aluminum handled brush. Little rubbing is done, as the water is simply sprayed on, the pressure as it comes out of the small openings being sufficient so that all parts of the car can be reached readily. After the exterior has been wet down a soap solution is applied. This solution is made up in advance and is kept in a barrel in one corner of the

A blower system of hot air heating is used at the West Farms carhouse of the Third Avenue Railway System. In circle — type of heater used in the wash room at the West Farms carhouse

General view of the wash room at the West Farms carhouse of the Third Avenue System

wash room. A 14-qt. pail of Amberzo vegetable soap, made by the Hildreth Varnish Company, New York City, is dissolved in a barrel of water. A pint of this solution is used to each 14-qt. pail of water for use on the car bodies. The soap solution is applied to the car body by round car washing brushes with handles of different lengths for reaching various parts conveniently. All of the brushes used are purchased from Whiting Adams, New York City.

Following the application of the soap suds, the exterior is scrubbed thoroughly with a flat floor scrubbing brush for large surfaces and a furniture rubbing brush to fit into the various corners and around moldings, window openings, etc. After the scrubbing, the rinsing is done with the aluminum handled brush, with considerable rubbing to make certain that all soap is removed. An ordinary type of squeegee, such as is commonly used for window washing, completes the outside washing program and prevents streaks while drying. After this the ventilator sash and side windows are wiped carefully with cheesecloth.

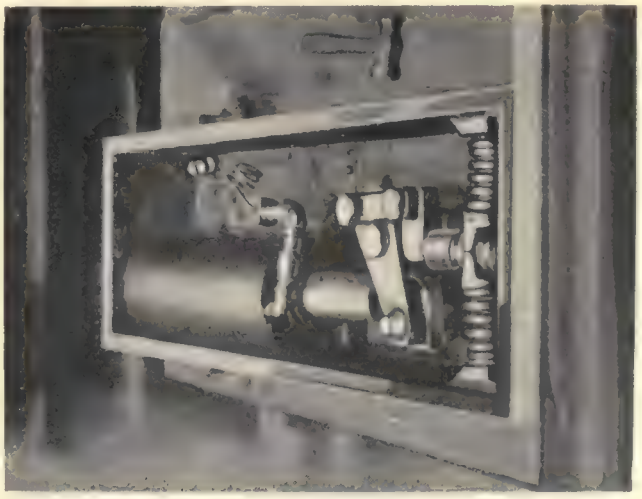
While the exterior of the car is being washed, men are busy inside. Platforms, vestibules, stanchions and similar parts are given the same scrubbing and washing as the exterior. Roofs are also given the same regular scrubbing. For washing the insides of windows of the car body a counter brush is used with plain water. No soap is used inside the car. Moldings, lamps, seats and other interior fittings are wiped with dry cheesecloth. It should be mentioned that cane seats are removed and scrubbed at the time the car goes through the shop on its regular painting schedule, and so the only attention given them during the monthly cleaning is to wipe off carefully and make certain that there is no oil or other material on them which might damage the passengers' clothing and so result in damage suits afterward. The flooring inside the car is flushed out with a hose. In all the interior washing particular care is exercised to make certain that water is not slopped or directed so as to reach any of the electrical apparatus.

This same general plan of washing is carried out at the ten carhouses of the Third Avenue system. The number of men at each varies, due to the differing numbers of cars maintained.

## Knoxville Installs Electric Switch of New Type

RECENTLY a new electrically operated track switch designed and patented by Charles A. Walker, electrical superintendent, Knoxville Power & Light Company, Knoxville, Tenn., was placed in service in that city. The first unit was constructed in the shops of the company.

As outlined in the patent application, the points of superiority claimed are that the electrical mechanism is contained within the non-magnetic casing, which can be filled with oil. The equipment thus inclosed is placed below the street surface in the usual manner, and the operating levers are connected directly with the switch point.



Mechanism of a new type of electric track switch developed in Nashville, Tenn.

It is claimed that the non-magnetic casing will be non-corrosive as well and the oil filling will prevent trouble due to moisture, either from leakage or from sweating. Suitable connections are made by which the wires are taken from the underground box by conduit to the side of the street, where connection is made with the trolley contacts in a conventional manner.

Building up a track switch with the electric arc

# Welding Track Without Car Delays

## Tracks May Be Kept in First-Class Condition by Welding with a Moderate Expenditure of Maintenance Funds — This Also Permits Effective Emergency Repairs to Be Made Speedily and Obviates Delays

**By Edwin P. Goucher**

**Engineer of Way and Structures Capital Traction Company, Washington, D. C.**

MAINTENANCE and construction work on the lines of the Capital Traction Company, Washington, D. C., is not allowed to interfere with the operation of the cars. Of course at times a delay of two or three minutes cannot be avoided, but a delay of four or five minutes means an investigation and possibly a reprimand to the guilty party. Cars are never rerouted in order to carry on construction work. Rerouting causes annoyance to passengers and perhaps requires a longer time for them to reach their destination. The installation of new track is done at night, after the last scheduled car has passed, and the track must be ready for the first regular car in the morning. If owl service is operated on the line in question the owl car is run in both directions on the adjacent track.

In this age of efficiency and economy it would be difficult to visualize what would result from a complete cessation of all practices and means of welding. This art as applied with present-day methods undoubtedly is saving millions of dollars annually in the maintenance costs for the electric railway industry alone. Not many years ago when a frog became badly worn, or a rail head broke, there was nothing else to do but buy a new frog or cut in a new piece of rail. Present-day welding methods have changed all this. On most properties a frog or switch, before being scrapped and replaced, has been built up with the arc at least once and possibly two or three times.

The Capital Traction Company is a firm believer in the value of welding as a means of reducing operating costs and making emergency repairs to obviate service delays. Three welders are kept busy practically the entire year building up worn frogs, cupped joints, worn guard rails and other miscellaneous work. Practically all of the tracks in the city of Washington are of the underground conduit type. Special work costs from six to ten times as much as similar layouts for the regular surface construction, so any one familiar with the savings effected by making welding repairs on surface track special work may readily understand that

this amount must be very much greater when the repairs are made on the conduit type of track. The saving alone in interest on investments probably more than carries all the costs of the welding equipment and labor expended in making these repairs.

As an example, there is a double-track crossing on the lines of the Capital Traction Company that will be renewed complete this year. This crossing was scheduled for renewal in 1925, but by means of electric arc welding it was possible to hold it over until 1927. This job will cost installed about $21,000 and the interest for that amount for two years at 6 per cent is about $2,500.

The ever-increasing need for labor and time-saving equipment has resulted in the development of many new machines for various classes of work, and in my opinion one of the most important is the welding outfit mounted on an automobile truck. The old way of towing or hauling the welding machine to the job and back again, leaving the operator and his helper to shift for themselves during the day, is fast becoming a thing of the past. The time wasted while the machine is moved from place to place by the men is too costly, not to say anything about the lost time occasioned while waiting for a truck to move the outfit a mile or two to another job.

Broken rail heads, frogs, etc., are discovered usually by some one in the construction or maintenance forces, but quite often a trainman will report this condition before any one else has noticed it, possibly shortly after the break occurred. Repairs are made immediately if the nature of the break is at all apt to cause a delay to the cars. If of a minor nature, a welder is usually allowed to finish the job on which he is working before leaving for the other location.

Metallic arc welding is used for this class of work on our lines. For ordinary cupped rails, worn guards and manganese plates a high carbon rod is used. Where the break requires a large deposit of metal, such as a broken rail head, a low carbon rod is used to build up the metal to within about ⅜ in. of the running surface and the harder rod is used to complete the weld. We find this method superior to the use of the high carbon rod throughout the weld, and of course the low carbon rod is not suitable for use where it will be subjected to wear.

**Several rail lengths are thermit welded at the side of the track and then are installed as one piece**

At top—Rails set up ready for mold boxes.
At left—Mold boxes in position ready for welding 122-lb. A.E.R.E.A. 7-in. trilby rail.
In center—Thermit reaction taking place.
At right—Weld after removal of mold boxes and before it is cleaned up.

The Capital Traction Company has now standardized on thermit joints for new construction. While this method of welding presents no serious difficulty on the average property, to those of us operating the conduit system it is quite a problem. We cannot install portable crossovers wherever we wish and divert traffic to one track, nor can we lay temporary track on which to operate cars.

First and foremost in the minds of all Capital Traction employees is the understanding that the cars must not be delayed. Our livelihood depends on the cars and avoidable delays are inexcusable. We have effectually solved the thermit welding problem by welding four to six rails together outside the track, installing them as one piece and welding the intermediate joints at night between 1 a.m. and 5 a.m. This adds materially to the cost per joint as compared to other methods, but we feel that the increased value of the thermit joint is worth the difference. Thermit is also used in the construction of frogs, crossings, repairing broken switch and frog arms and in making compromise joints.

Cutting, brazing and welding with the oxyacetylene torch is now another large factor in track maintenance. This is probably more true of conduit track maintenance than of surface track, due to the increased use of iron and steel in the conduit type of construction. Each of the Capital Traction welders has a complete gas cutting and welding outfit in addition to the regular arc welding equipment. Frequently the combined use of these two methods results in a considerable saving in time.

When present-day traffic conditions are taken into consideration, the wonder is that any trackwork can be repaired or reconstructed without great expense for labor. This would undoubtedly be the case were the hand methods of past years still in use. But labor-saving tools have been developed and are being used to such an extent that instead of an increase, there actually has been a reduction of about 40 per cent in labor hours expended per foot of track on reconstruction work. The decrease of 40 per cent has been the experience of this company, and when this percentage is applied to present labor rates, we can see an actual saving in labor alone of more than $20,000 per mile of conduit track reconstruction, as compared with similar work before we had labor-saving equipment.

While welding equipment cannot be credited with a substantial part of this saving, it nevertheless plays a very important part in the upkeep and maintenance of the road, and in my opinion is probably responsible for as great a saving in that particular field as are our air compressors, derricks, etc., when used on construction work.

## Dynamometers Regulate Tension of Trolley Wire

ON THE Boston Elevated System about 50 per cent of the trolley-wire breaks are due to fatigue, or crystallization. These are caused by the moving up and down of the wire at points of attachment and by vibrations set up in the wire by passing trolley wheels.

Many more of this class of breaks occur during the months of high temperature than during the low temperature months. For example, in June, July and August, 1926, there were 38 breaks of this nature, and in January, February and December there were nineteen breaks. In winter the wire is tight, due to contraction, and in the summer it is slack, due to expansion. This indicates that the tightness of the trolley wire has much to do with the development of crystallization.

Last September dynamometers were furnished each line maintenance crew, and the trolley wires are now pulled to tensions according to temperature, as follows:

| | |
|---|---|
| At 0 deg. | 2,100 lb. |
| At 30 deg. | 1,800 lb. |
| At 60 deg. | 1,500 lb. |
| At 90 deg. | 1,200 lb. |
| At 120 deg. | 900 lb. |

Wire pulled to these tensions will have at zero temperature approximately 3 in. of sag in a 100-ft. section and 7¾ in. sag at 120 deg.

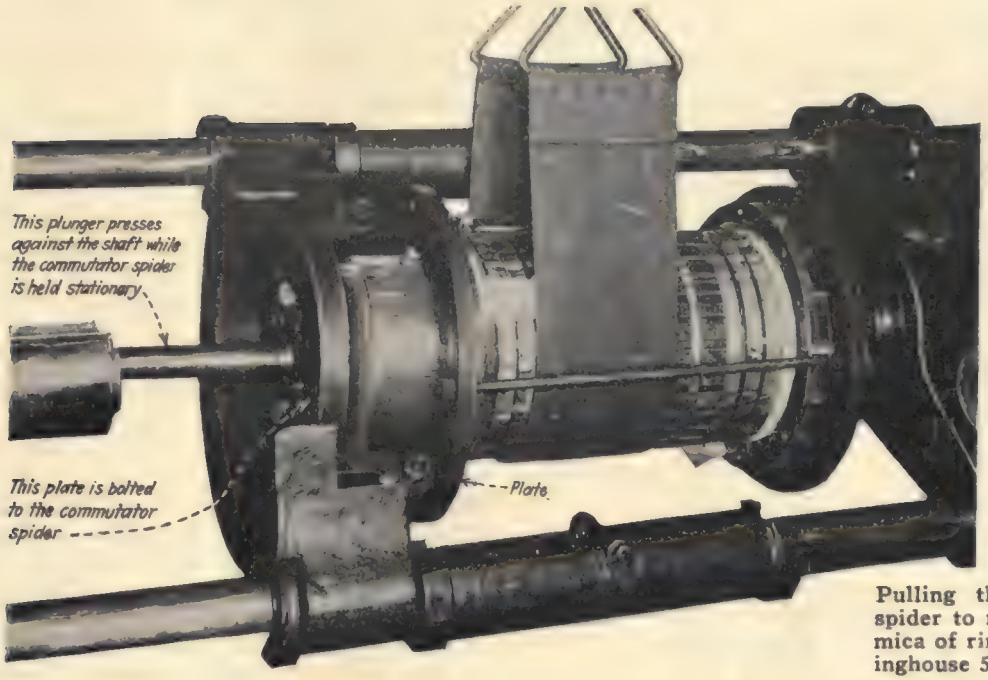
Previous to the use of these instruments the trolley wire was pulled until the men considered it tight, the wire being pulled to the same degree of tightness in winter as in summer, hence wire installed during cold weather was very slack in summer.

Cutting with the oxyacetylene torch produces savings in track maintenance

# Preventing Flashovers

## Is an Important Part of

# Commutator Maintenance*




Pulling the commutator spider to repair the front mica of ring of the Westinghouse 557-R1 armature

**Shellacking Mica V-Rings at Frequent Intervals Produces a Hard, Glossy Coating to Which Dirt and Carbon Dust Will Not Adhere Readily—Creepage Currents Are Decreased with Reduction in Flashovers**


**By Jesse M. Zimmerman**

Renewal Parts Engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.


FLASHING over of the current from the commutator bars of railway motor armatures to the front metal V-ring is due largely to the presence of oil and moisture on the insulation. This tends to collect dirt and carbon dust, which mixture acts as a good conductor for creepage currents. Each flashover consumes part of the bond in the insulation as well as carbonizing the oil which may exist in or on the mica V-ring. This will permit an increase in flow of creepage current between the bars which eventually will become a small arc. When this occurs it soon will decrease the dielectric strength of the ring and at some future time ground the commutator.

As "an ounce of prevention is worth a pound of cure," the prevention of grounded commutators and the flow of creepage current on the front mica V-ring is quite as important as methods of repairing grounds. It is good practice to make the surface of the mica V-ring as smooth as possible, so that the dirt and carbon dust will not adhere readily to it.

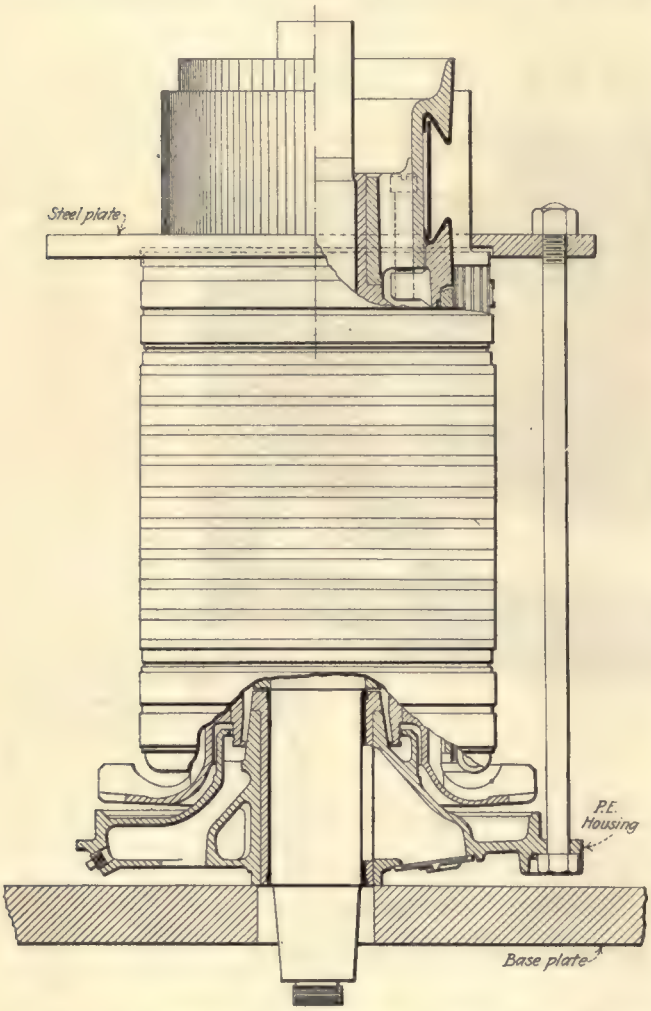
### Repairing Pitted Bars

If the front ends of the copper bars are badly pitted they should be machined so that the mica is flush with the copper. It will do no harm to take $\frac{1}{16}$ in. from the bars. The front edge of the commutator face should not come to a sharp corner, but should be rounded off so that it will have a radius of at least $\frac{1}{16}$ in. to $\frac{1}{4}$ in. A sharp corner increases the number of flashovers be-

*This is the seventh of a series of articles on commutators for railway motors. The others were: Choosing Materials for Railway Motor Commutators, published Aug. 21, 1926; Important Considerations in Replacing Commutator Bars, published Oct. 23, 1926; Accurate Machining of the V's of Assembled Commutators Is Essential, published Nov. 20, 1926; Mica V-Rings and Bushings Have Important Functions in Commutators, published Dec. 18, 1926; Methods and Equipment for Efficient Assembling of Commutators, published Jan. 15, 1927, and Soldering of Railway Motor Commutators, published Feb. 19, 1927.

cause the electrical potential tends to build up on sharp edges. When an unbalanced voltage condition occurs in the operation of the motor a flashover from the sharp edge of the commutator face to some metal part of the motor will result. This flashover always leaves a pitted place on this part of the commutator.

The mica V-ring should be cleaned carefully with sandpaper, making sure that no dirt remains on the mica in the corner next to the commutator bars. Dirt




**Fixture for holding bars in position when removing the commutator spider. This is for use with armatures similar to Westinghouse 557-R1 and 587-D5**

should also be removed from the groove between the front end of the mica V-ring and the metal V-ring.

The front mica V-ring should be brushed, also, with a coat of heavy pure orange shellac and a smooth layer of soft four-ply twine wound on closely, pulling the ends through with a loop to fasten. It is best to place the mica V-ring protection on the commutator before the armature has been dipped and is ready to be placed in the baking oven. This will permit the protection to be baked at the same time. The essential feature is that the V-ring protection be thoroughly hardened before the armature is placed in operation.

This twine should be covered with three coats of shellac, ironing each coat in thoroughly with a hot iron. The first coat should be very thin so that it will penetrate the twine thoroughly. After the shellac has become hard it should be covered with a coat of black glossy baking varnish and baked thoroughly. This will leave a hard, glossy surface which can easily be kept free from dirt, moisture, oil and carbon dust. After hardening of the third coat of shellac some operators use one or more coats of commutator compound. This should cover the front ends of the bars, making a fillet of large radius between them and the mica V-ring and filling the groove between the front end of the mica V-ring and the metal V-ring. A commutator compound should resist oil and moisture as well as withstand flashovers. Some operators have found a satisfactory composition to be plaster of paris, dextrine and shellac, applied directly on the mica V-ring. However, a compound made of an iron oxide preparation gives better results.

In some shops it may not be convenient to bake the armature when applying mica V-ring protection. A good grade of air drying varnish should then be used instead of a baking varnish. The average commutator compound on the market will harden in four or five hours without being baked.

At every regular motor inspection period the mica V-ring protection should be cleaned. This can be done by wiping with a cloth dampened with gasoline. If this is carried out grounded commutators will be decreased.

### Methods of Removing Grounds

Commutator grounds are more frequent in the front V than in the rear V. Sometimes it may be necessary only to remove the front mica V-ring, while at other times the commutator may be burned so badly that one or more bars will have to be replaced and the front metal V-ring repaired. Any holes burned in the metal V-ring should be built up by welding and finishing so that the mica ring will have a uniform seat.

Where the front metal is detachable the work of repairing the ground without disturbing the armature winding is very simple. Repair of commutators having the detachable metal V-ring in the rear is slightly more complicated. To replace the front mica V-ring in this type of commutator the commutator spider must be removed. At a glance one would think it necessary to remove the armature leads from the commutator to remove the complete commutator. With an inexpensive fixture this can be done without disturbing the commutator bars or the armature winding, as shown in an accompanying illustration.

A steel plate is made which fits against the front end of the assembled segments. It should have an offset so that the brush face of the commutator segments will hold it in a central position. The plate should have holes the same in number and size and on the same bolt circle as the pinion end housing.

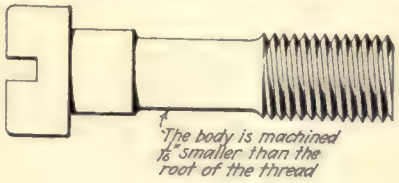
To hold the commutator bars several turns of steel banding wire should be wrapped on a paper in the groove in front of the neck and be soldered in one spot. The pinion end housing can then be assembled on the armature shaft and the armature placed in an upright position. With the steel plate on the front end of the assembled segments bolted to the pinion end housings by means of long bolts, the commutator bolts can be removed and the commutator spider pressed out in a suitable press.

With this fixture it is possible to hold the commutator bars against the rear V-ring, thereby keeping them in position, while taking out the commutator spider. If several commutator bars are to be renewed the armature should be placed in an upright position after the commutator spider has been pulled before the banding wire is cut and the fixture removed. Should it be

necessary only to replace the mica V-ring the fixture and banding wire should not be removed.

When several of the bars are burned badly they should be replaced. A simple method of preparing new bars is to remove the damaged bars, together with an undamaged adjacent bar for a pattern. By clamping the unfinished bar in a vise with the pattern bar it can be trimmed to approximately the outline of the pattern. If the V's have been rough sawed or punched, the amount of filing may be reduced by taking an extra cut with a hacksaw. A new mica strip should be cut to the same size as the unfinished bar and fastened to the copper with a thin coat of heavy pure orange shellac. By clamping the unfinished bar and the pattern in a vise with a mica strip between them, the V's of the new bar can be filed to the same size as the pattern bar. The radius in the V's can be finished with a small rat-tail file and the bars are ready.

After assembling the new bars in the commutator the fixture should be put back on so as to hold the bars in position while the spider is being replaced. The armature leads should not be put in the slots of the new bars until the commutator has been tightened. Long headless stud bolts with a finished body should be screwed into the rear detachable V-ring before pressing the commutator spider onto the armature spider. These studs will serve as guides, accurately locating the bolt holes. After the commutator spider has been pressed on the armature shaft the studs should be replaced by the regular commutator bolts. Next the alignment of the bars should be checked in order to insure good commutation. It is also essential that the commutator be heated to at least 100 deg. C. before the bolts are drawn tight. This will soften the bond in the mica, permitting it to adjust itself to the irregu-




Commutator bolt designed to eliminate breakage

larities of the metal parts and making it possible to obtain a tight commutator. A higher temperature should not be permitted as the armature coil insulation will deteriorate.

Bolt failures often are due to excessive length. The bolt strikes the bottom of the hole before the commutator is tight. The man tightening the commutator, not knowing of this, subjects the bolt to an excessive strain. To make sure that this does not happen, it is advisable to place the detachable steel V-ring in its final position and draw the commutator bolts tight before the commutator is assembled. This will show whether they are too long.

Breakage of commutator bolts can be decreased by machining the body approximately 1/16 in. smaller than the root diameter of the threads. If the body of the bolt is larger than the thread root any twisting effect or expansion will occur at the end of the thread, causing a break at this point. If the body of the bolt is smaller the expansion and twisting effect will be distributed over the entire length of the bolt. The seat of the bolt near the head should be sufficiently large to insure a good contact in the detachable steel V-ring.

## Electrically Heated Pots in Babbitt Department

SOME months ago the Pittsburgh Railways reorganized its Homewood shop and concentrated all of the maintenance work there, including all the rebabbitting of bearings. After some study it was decided to install four Westinghouse automatic electrically heated babbitt melting pots of 750 lb. capacity each. These pots were grouped as shown in the accompanying illustration.

Relining an armature bearing in the new babbitting department of the Pittsburgh Railways

The two in the foreground contain armature bearing metal, the two in the rear metal for the journal babbitt. These pots have sufficient capacity to take care of all the bearings needed daily for the Pittsburgh Railways system, which operates approximately 1,250 passenger cars in addition to its miscellaneous equipment.

The automatic feature is convenient, as the danger of under or over heating metal is eliminated. At 6 o'clock in the morning the shop watchman turns on the current and by the time the men arrive for work at 7:30 the babbitt is at correct temperature for use. The automatic feature keeps it at this temperature until quitting time at night.

Under the system previously used two babbitt rooms were maintained. Gas heating was used and six men were employed solely on bearing work. At present two men take care of this department and have made it what the gentleman in the illustration calls "the show place of the shop," as well as a very efficient section.

## Route Numbers for Public Service Cars

ALL cars operating in the Essex Division of Public Service Railway, Newark, N. J., henceforth will carry route numbers in addition to other signs indicating destinations. Cars of the Central line are already equipped and those of other lines will follow.

A sign with numbers in white on a blue background will be placed on the right-hand front corner of the roof of each car, one number facing the front and another the side.

Public Service bus lines have carried route numbers for some time, routes being designated by even numbers. Street car lines will be designated by odd numbers and bus lines and car lines operating in the same territory will as far as possible carry contiguous numbers.

Air reservoir being given a hydrostatic test. The workman in the rear is placing a canvas liner in a reservoir hanger

## Inspection Methods that Made Possible

# 100 Per Cent Operation

### On Dec. 20, Last Year, the Chicago Surface Lines Operated All of Its Passenger Cars and for Three Days Following This 99.97 Per Cent Were Operated

**By T. H. Shaughnessy**
Assistant Superintendent of Shops and Equipment Chicago Surface Lines, Chicago, Ill.

OPERATION of 100 per cent of all passenger cars owned by an electric street railway company is considered remarkable, but when this record is established by one of the largest street railway systems it is an achievement—something that did not "just happen," but the result of plans carefully worked out and details followed to the end. Therefore, the task imposed upon the shops and equipment department of the Chicago Surface Lines was by no means a light one. This was referred to briefly in an article in ELECTRIC RAILWAY JOURNAL for Jan. 1, 1927, page 10.

During the late summer and fall months special inspection and attention were given to all parts of the electrical equipment. All main fuse boxes were overhauled and inspected carefully. The terminals were tightened and renewed where necessary, insulating partitions and barriers were cleaned and boxes were given a coat of good insulating paint, inside and out.

Motor junction boxes and terminal boards were cleaned out thoroughly. All terminals, terminal screws and sleeves on the end of motor leads were checked and put in first-class condition. Also the motor leads themselves were thoroughly inspected, broken insulation was repaired and leads were renewed where necessary and repainted.

The rheostats were tested for weak insulation and cleaned. The rods tightened, all leads were examined closely and the terminals were tightened. The wooden supporting sticks were cleaned thoroughly and then repainted. Any that were found charred near the bolts, due to current leakage from defective rheostats, were renewed.

Electric heaters were blown out with air, the supports were tightened, the heater coils checked, terminals tightened and coils or heaters renewed where necessary. Thermostats and thermostat switches were inspected, contacts renewed where necessary and all parts tightened. Heater fuse boxes received a special inspection and all weak or burned fuse clips were renewed.

All air tanks were given a hydrostatic pressure test equal to 1½ times the working pressure. Then they were thoroughly painted and a new strip of canvas, soaked in

paint previously, was installed between the tanks and their supporting bands and hangers. The safety valves were tested and governor settings were checked. At the same time all air gages were checked by the method of installing a master air gage in the air line.

All car wiring and motors were tested carefully with instruments. This is the regular practice in our shops at general inspection periods.

Truck and car body inspection and repairs were also given closer attention than usual. Material and supplies were prepared in sufficient quantities to meet all requirements. Corner posts, vestibule posts and other parts were painted and kept in stock, ready for installation when required.

Terminals as well as fuses were given careful attention

At the carhouse foremen's semi-monthly conferences the importance of putting all cars and equipment in the best possible condition was stressed and time and again it was pointed out that it was the duty of every one concerned to believe in himself and in the value and necessity of his work.

With the work in the shops reduced as cars were not taken in for general overhauling, workmen were transferred to the carhouses, to assist in making repairs to cars having damage done to the body, vestibule, etc., with the result that a total of 182 cars were repaired and placed in rush-hour service during the four days preceding Christmas Eve, as shown in the accompanying table.

When it is considered that more than 20 per cent of the cars in use have two-motor equipments and a failure of any kind would put a car out of service the standard of maintenance is self-evident.

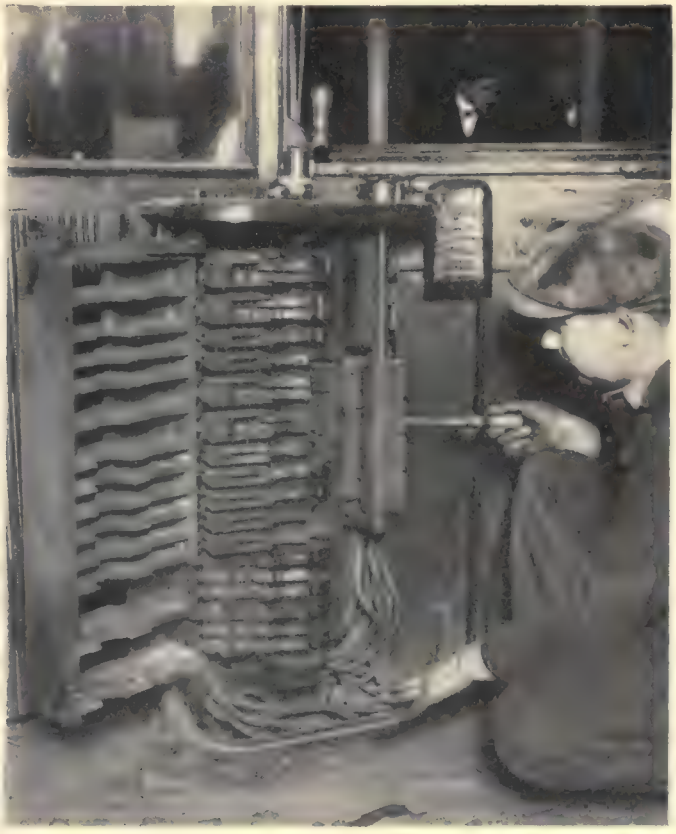
With the 100 new cars delivered during the year and available, the work in connection with overhauling cars was kept up until Dec. 7. No cars were taken into the shops for overhauling after that date. There were in the two shops on Dec. 1 67 cars for overhauling and 54 cars for damages and other repairs, or a total of 121.

On Dec. 7, the last day that cars were taken in for overhauling, there were 55 cars undergoing overhauling and 35 in for damage repairs, a total of 90 cars in

CARS REPAIRED AT CAR STATIONS AND SHOPS AND PLACED IN RUSH-HOUR SERVICE, DEC. 20 TO 23, INCLUSIVE

| 12–20 | 12–21 | 12–22 | 12–23 | Total |
|---|---|---|---|---|
| 47 | 39 | 46 | 50 | 182 |

Motor lead junction boxes were inspected carefully and all connectors tightened



All parts of controllers received special attention on inspection

the two shops. This total was reduced to zero on Dec. 20 and increased again to one car on Dec. 21, 22 and 23, due to one car being sent in each day with heavy damages, which could not be completed before the rush-hour period.

During the month of November at the sixteen carhouses approximately 25 cars per day were held in for repairs during the rush-hour period, or about 1.5 cars per carhouse. This number was reduced, so that from Dec. 1 to 19 the number of cars held in daily for repairs at carhouses during the rush hour was approximately eleven, or practically 0.7 car per carhouse per day. An accompanying table shows the number of cars available, number of cars operated and number of cars in carhouses and shops from Dec. 1 to 23 inclusive.

Heaters were blown out with compressed air and all supports, terminals and coils were tightened

CARS AVAILABLE AND OPERATED BY CHICAGO SURFACE LINES DEC. 1 TO DEC. 23, 1926, INCLUSIVE

| Date | No. Cars Available | Per Cent | No. Cars Operated | Per Cent | No. of Cars in Carhouses | Per Cent | No. of Cars in Shops | Per Cent |
|---|---|---|---|---|---|---|---|---|
| 12- 1 | 3,490 | 95.9 | 3,384 | 93.0 | 28 | 0.8 | 121 | 3.3 |
| 12- 8 | 3,557 | 97.7 | 3.497 | 96.1 | 6 | 0.2 | 76 | 2.1 |
| 12-15 | 3,621 | 99.5 | 3,589 | 98.6 | 2 | 0.06 | 16 | 0.44 |
| 12-16 | 3,619 | 99.45 | 3,597 | 98.8 | 5 | 0.14 | 15 | 0.41 |
| 12-17 | 3,625 | 99.61 | 3,597 | 98.8 | 5 | 0.14 | 9 | 0.25 |
| 12-20 | 3,639 | 100.0 | 3,639 | 100.0 | 0 | 0 | 0 | 0.00 |
| 12-21 | 3,638 | 99.97 | 3,638 | 99.97 | 0 | 0 | 1 | 0.03 |
| 12-22 | 3,638 | 99.97 | 3,638 | 99.97 | 0 | 0 | 1 | 0.03 |
| 12-23 | 3,638 | 99.97 | 3,638 | 99.97 | 0 | 0 | 1 | 0.03 |

It will be noted from the table that on the four days immediately preceding Christmas Eve there were no cars held in for repairs at any of the carhouses during the rush-hour period. This means that 100 per cent of the cars at the sixteen operating carhouses were available and operated during the rush-hour period on four consecutive days. As far as is known by the writer, this record has never been equaled.

The co-operation of the transportation department with the shops and equipment department in the careful handling and operation of the equipment was of course essential, and it was through a complete understanding and co-ordinating of interests that the exceptional results were accomplished. All operators entered into the work with enthusiasm and by careful handling of mechanical and electrical apparatus failures due to service abuses were reduced materially. The primary objective of the entire organization was to keep cars in service and to avoid delays that would inconvenience passengers.

The high class of maintenance work that formed an essential part of the continuous program for putting car equipment in first class condition through regular overhauling and careful attention to maintenance details provided a substantial foundation for such an undertaking. Many defects were discovered before they actually produced trouble and so the real work of repairs was reduced. Also by providing a supply of spare parts and equipment ahead of time, defective parts could be replaced quickly and the actual work of repairs made during periods when more attention could be given to the work. By providing a maintenance program so as to make all cars available for service during the periods of maximum load an investment in extra equipment to take care of proper service was avoided.

Car resistors were given a thorough test with instruments

Many small tools such as concrete breakers and tampers are used in track maintenance by the Pittsburgh Railways

# Pittsburgh's Track Repair Organization Permits No Delay to Service

## The Construction and Maintenance Sections of the Way and Structures Division Work with the Municipalities Through Which the Company Operates and Meet the Various Schedules of Improvements that Are Undertaken

**By O. Williams**

Superintendent of Way and Structures Pittsburgh Railways, Pittsburgh, Pa.

UNDER the new organization of the Pittsburgh Railways all maintenance and construction of track is handled by the maintenance of way and structures division of the operating department. This department is headed by a superintendent reporting directly to the general manager. In order to meet the heavy demands for new track and also to keep the present tracks in good, safe operating condition the work is divided between the maintenance and construction sections, each of which is headed by a superintendent reporting to the department head. The maintenance section deals chiefly with the repairs of track and paving and the installation of small jobs of special work needed for renewals. The construction section does the larger renewal and construction jobs, as this department is especially equipped for the purpose with modern labor-saving devices. The personnel of the construction section is made up of a superintendent, three general foremen and ten construction foremen. The number of men employed throughout the season will vary between 150 and 250, depending upon the quantity of work on hand.

The equipment of this department consists of four Thew shovels mounted on standard car wheels, three one-bag concrete mixers, two large 10-in. x 10-in. air compressors, three 6-ton steam rollers, two complete thermit welding outfits, six steel Differential dump cars and many smaller tools, such as pneumatic concrete breakers and tampers. All of this equipment except the steam rollers is operated with direct current taken from the trolley wire. In moving the shovels and concrete mixers from place to place the motive power is supplied by one of the dump cars. The air compressors and welding outfits are mounted on single-truck motor cars and so can move readily from place to place under their own power. The steam rollers are transported on flat cars, generally pulled by a dump car. Supplementing all this equipment is a Universal crane

Preparing new track foundations in West Liberty near Pioneer Street

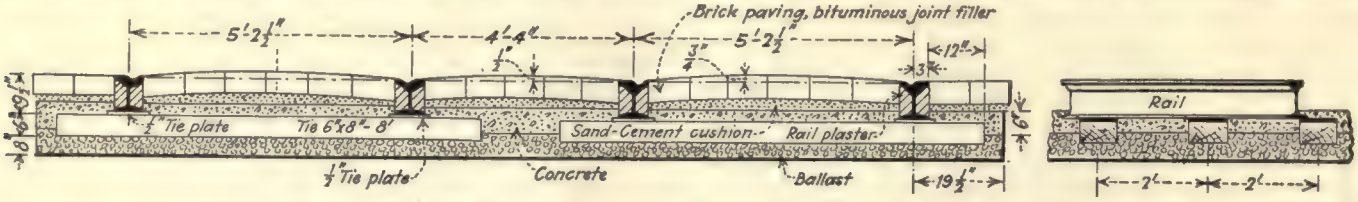
mounted on a 5-ton Mack motor truck and also an electrically operated crane mounted on a double-truck car body. These two cranes are also used whenever needed by the maintenance department in the installation of special work jobs.

In 1924, when the Pittsburgh Railways was removed from the receivership, the agreement entered into with the city of Pittsburgh provided a blanket annual payment of $300,000 in lieu of paving charges, taxes, etc. It states that the work of repaving brought about by track removal or replacement, maintenance of track or car operation shall be done by the railway under the plans and specifications submitted to and approved by the director of public works. In case the mileage of track operated in the city is increased or decreased, either by annexation of contiguous territory or by construction or removal of tracks by the company, then the yearly payments as provided shall be increased or decreased proportionately.

After the signing of this agreement by the city of Pittsburgh the railway immediately presented the same proposition to the various boroughs and townships in which it had tracks upon paved streets. As a result there are now, including the city of Pittsburgh and Allegheny County, 38 municipalities operating under this agreement. Also several agreements are in effect in which the railway company has agreed to install the concrete base and the municipalities to furnish the surface paving. Under the agreements the new track constructed by the railways is determined almost entirely by these municipalities in preparing their repaving schedule.

The main problem confronting the construction section was how best to meet these various schedules and improvements of the municipalities, working with them and their contractors in making these changes, and still work efficiently. Due to the wide range of territory served by the Pittsburgh Railways it was determined that the track to be built in the farthest outlying districts would be done by contractors, while the company's forces would operate within the city, or at least within a reasonable radius, in order to facilitate the transporting of equipment from one job to another. The railway next proceeded to prepare a schedule of the starting and finishing dates for certain sections of track on each job, arranged so as to conform with the starting dates used by the municipalities for the paving of the flank. In this way the railway was generally able to build one track and move to the next location while the municipalities' contractor finished the street flank on the first job, after which the railway would return and build the other track, which in turn would be followed by the street flank.

Since the various municipalities had several jobs scheduled to start at approximately the same date, the construction gang was divided into six units of approximately 25 men each. Thus all jobs could be under construction at the same time. In this case two jobs were handled by one general construction foreman, who moved his equipment from one job to another in the order in which they were needed. After certain experiments and slight rearranging of the schedule it was possible to place a shovel on a job, finish a stretch of grading, move to the next job and start grading again with but little lost time. The same procedure was used with the tamping and roller outfits, so that in all there was an almost continuous rotation of equipment. The welding gang necessarily followed closely with the final




Typical cross-section of track construction used by Pittsburgh Railways

Concrete used in track construction on East Street

Ballast in place on section of track on McClure Avenue

tamping operation on each job, pouring and grinding the necessary thermit welds.

This method created a tendency to improve the efficiency of each of these units by putting them on a competitive basis, as each had to keep up in order to permit moving upon scheduled time to the next job. Doing the work in this manner resulted in an almost uniform speed of about 650 ft. of finished track per week by each gang throughout the construction season. In attaining these results the assistance and co-operation given by the municipalities and contractors was of the greatest importance. Also contributing to the success was the excellent condition of the construction equipment, which had been overhauled thoroughly by the individual operators in the railway shops during the previous winter shutdown.

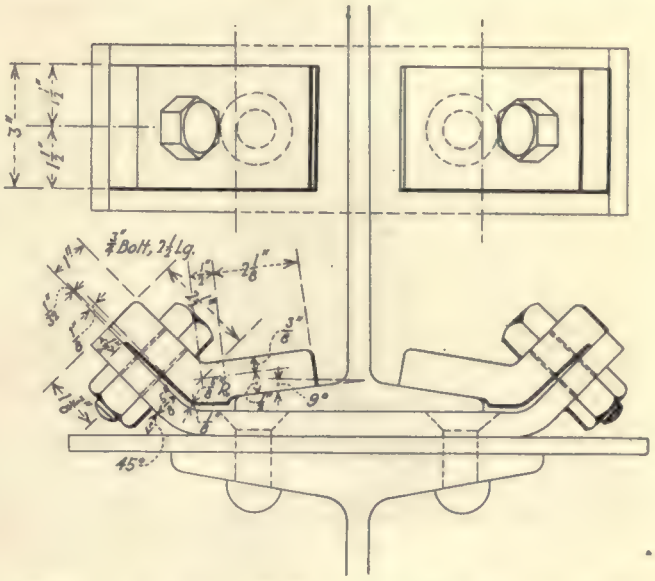
As is usual with all schedules, many things arose which had not been anticipated. There developed, as the season progressed, certain improvements which were deemed necessary and which necessitated the construction or rebuilding of some track. These were fitted into the schedule as well as possible, and whenever the construction gangs were too busily engaged to take care of the work it was allotted to the maintenance section and carried through in that way.

There were also quite a few jobs which required a little extra attention and in which more than ordinary conditions covering track reconstruction had to be met. A few examples of this will give some idea of this:

In placing the rail across the Ninth Street bridge it was determined to use thermit-welded joints. As this bridge has a steel deck upon which had been fastened clips to receive the rail it was necessary that the rail first be laid on ties, the entire length welded, then dropped into place on the clips and bolted into position. The design of these clips is shown in an accompanying sketch.

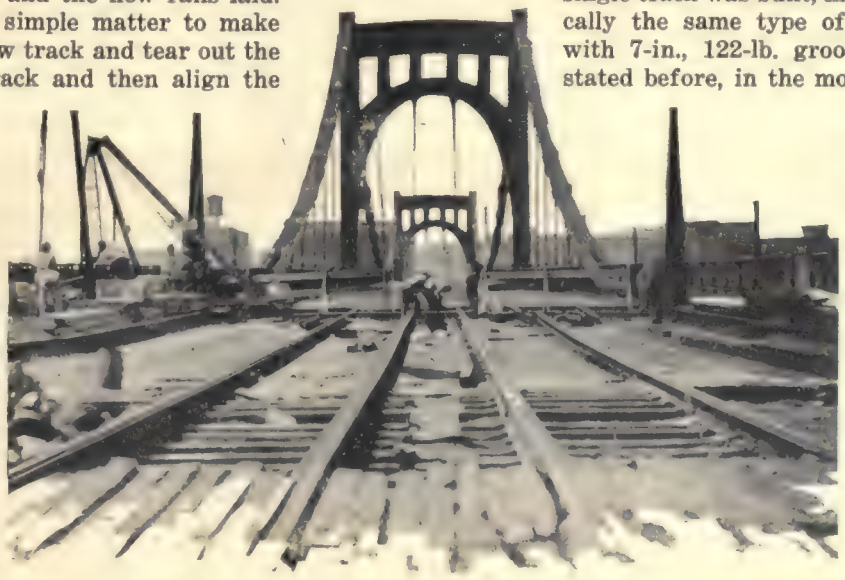
In another instance it was decided to reconstruct only one track in the center of a street where previously there had been two, and also that this should be done without any interference to traffic. This was accomplished by placing temporary crossovers, removing one track, taking out as much of the sub-grade for the new track as possible with a shovel and completing the grade by hand. This, of course, extended somewhat into the second track. The ties were then placed between the ties of the old track and the new rails laid. After this it was a simple matter to make connections to the new track and tear out the section of the old track and then align the new track in its proper location.

In another instance it was necessary, due to county road improvement and the necessary installation of a large special work job at an important intersection, to unite both the maintenance and construction sections. These worked day and night to speed up the installation. With the closing of the Sixth Street bridge it was decided to install an additional loop to assist in rerouting the cars formerly crossing the bridge. Here again the construction section found it necessary to build a track in a heavily congested district on a street where there already was one track which could not be disturbed until the new one and its connections had been completed. This situation was met by first constructing as much of the new track as possible and then during a night in which the cars were rerouted making the necessary connection at each end. At this time also the maintenance section was called in to assist, as extreme speed was necessary.



Type of clip used to hold rails on Ninth Street bridge

In summing up the results accomplished by this department it was found that in 1926 approximately 16 miles of single track was built in the city limits of Pittsburgh. The straight track in this total was built of 9-in., 134-lb. grooved girder rail laid on 8 in. of gravel ballast and 6-in. x 8-in. x 8-ft. oak ties. The joints were all made by the thermit-welding process. The special work in most cases consisted of 9-in., 152-lb. grooved rail placed on the same type of construction. Outside of the city of Pittsburgh some 14 miles of single track was built, most of it using practically the same type of construction except with 7-in., 122-lb. grooved girder rail. As stated before, in the more outlying localities the track was built under contract. Of this there was a total of approximately 6½ miles, about 3½ miles of which was built in Glassport Borough, some 2 miles in the city of Washington, Pa., and 1 mile in the city of McKeesport. Thus a total of approximately 30 miles of single track was reconstructed last year on the system.


Reconstructing tracks on the Seventh Street bridge, Pittsburgh

After removal of grease and dirt with pumice stone, the surface is rinsed with warm water applied with a sponge

# Frequent Painting Required

## for Modern Rolling Stock

### Improved Methods Will Reduce Painting Costs so that Railways Can Afford to Paint Oftener—Cars Should Be Painted Once a Year

**By A. T. Clark**
**Superintendent of Rolling Stock and Shops**
**United Railways & Electric Company, Baltimore, Md.**

KEEPING cars attractive requires a carefully worked out system for cleaning and frequent painting. Old-time methods produce a beautiful finish and long life for the paint, but with the present congested city traffic, which soon scratches and mars the surface, frequent painting is most essential. The older systems of painting were expensive and the piano finish which was secured is not needed for a street car. The most essential feature is an attractive appearance of the car as it is viewed from the sidewalk. By adapting methods that will reduce cost and keep the time of painting at a minimum, more frequent painting can be done economically.

Old-time car painting methods followed closely the practices used in fine carriage and coach building and the workmen were, for the most part, recruited from shops that built vehicles of that type. Such a workman had served for many years under an arduous apprenticeship, and only when able to take a carriage or coach and paint, varnish and stripe it completely, doing all the work alone and unaided, was he considered a "coach" painter.

On the United Railways & Electric Company of Baltimore some years ago such a method was standard, and cars as turned out were indeed attractive. An accompanying illustration shows a car painted in that manner. The lower panel was in cream with an orange-yellow broad and fine stripe. The upper panel was painted in dark Tuscan red with an aluminum broad and fine stripe. The broad aluminum stripe was edged in black. The belt rail, corner posts and intermediate posts were in cream color and the letterboard in Tuscan red. The doors and sash were all natural cherry, filled and varnished. The numbering and necessary lettering were aluminum stripe with black edging.

Higher wages increased the cost, and combined with the great length of time the vehicle was in the shop, it was felt necessary to study some means to reduce time and cost. The older method required after the priming coat, which was usually a lead and oil mixture, with the oil percentage large, three or four coats of "rough stuff" or surfacers. Each required about 24 hours for drying. After the last of these coats had stood for 24 hours, a carefully trained painter with a rubbing block and water brought the car surface to a high degree of smoothness. Great skill was required to prevent rubbing more at some points than others, which would produce low places that would show up when the final varnish coats were applied. After this one or two coats of body color were put on, and then the successive coats of varnish, which

were also rubbed down, until the final coat, usually of finishing varnish, was applied. The numbers, lettering and decorations were put on after the first coat of rubbing varnish.

Considerable study and experiment showed that a great reduction could be made in the cost of painting cars by substituting the glazing coat of oil and white lead, made of such consistency that it would dry hard and sand smoothly. It was also found that enamel could be substituted for flat color and varnish coats. Exterior surfaces in natural woods, varnished only, while very attractive when new were difficult to keep that way and as a rule soon perished. Today almost universally such surfaces are painted, then varnished, as is the rest of the exterior of the car. Lettering and striping have been eliminated generally, and such as remain are applied in the decalcomania form. As might be expected, with the former high cost of painting, together with a painting period of approximately fourteen days, it was not possible to pass many cars per year through the paint shop. Hence the periods for successive shopping for paint were two to three years. As an average this was too long for best results, and instead of cars being improved in condition, every so often the undercoats were so defective as to require burning off. This added still more cost and time to the car painting. As a result of experience with the practices that we are now pursuing, it has been found that it is quite possible, at a fairly small cost per car, to send the cars to the paint shop every twelve months. Such fairly frequent attention keeps the exterior painted surfaces in an excellent state of preservation.

Of course, there occurs today, as a result of the congestion of vehicles in the crowded streets of our large cities, an unusual amount of damage to exteriors of cars, so that, no matter what care or cost has entered into the preparation of a painting job, the vehicle is liable to damage that will decidedly mar its appearance. It is evident that the least expensive method of painting, giving good appearance, is preferable to a more expensive method giving results of the old-time carriage work.

The following methods are now pursued in the painting of cars of the United Railways & Electric Company:

The foreman painter keeps a card index record of each car by number, filed according to the months in which they were painted. Thus, by looking through a group of cards, he knows almost instantly those cars which should be sent to the shop for painting. He prepares a list which is turned over to the foreman of the motor and truck shop, who has charge of the transferring crews, and is thus provided with cars to work upon.

Simplified color schemes are the standard practice in Baltimore

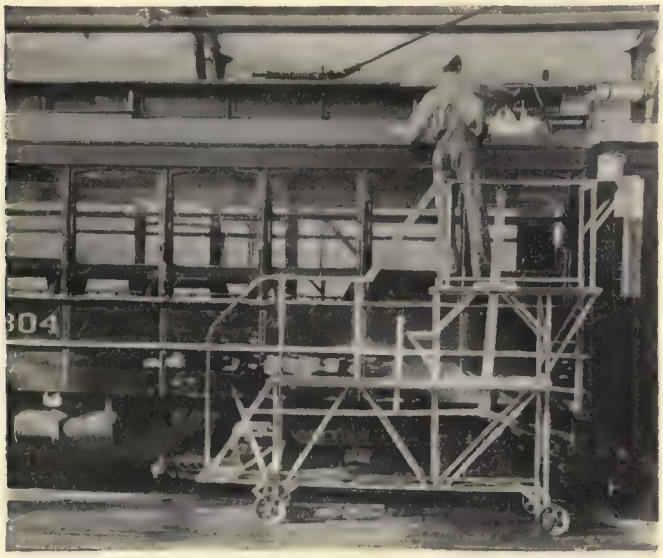
### Method Used for Painting a New Car

As the cars are brought to the paint shop they are examined by the carpenter shop representative, who fixes any loose or damaged panels or moldings, and does any other work of this nature required prior to painting. While this is going on the car trimmers remove seats, side-window screens and Hunter signs. In the meantime the roof painters have given the roof a coat of paint. A special type of portable scaffold has been found efficient for the painting of monitor sashes and side roofs. The car is cleaned on the outside, from top to bottom. In order that the car will clean more rapidly a coat of weak acid is placed on as much of the surface as is possible at one time with a 4 or 5-in. wall brush. Then follows a washing with liquid soap made of linseed oil and potash, put on with a brush. The cleaners next rub the surface with No. 1 steel wool to remove the dirt and grease. Around the heads of nuts and bolts it has been found that a little fine pumice stone will assist the removal of accumulated grease or dirt. With a sponge and lukewarm water, the surface is rinsed thoroughly. An accompanying illustration

Old-time painting methods gave much attention to striping and lettering

shows a portable scaffold, which has been designed specially so that two can work at the same time. When the upper portion of the side of the car has been finished, the remaining lower half is similarly finished by working from the floor.

As soon as the car has dried thoroughly, all the surfaces which exhibit cracks, nail holes, scars or other imperfections are coated with a lead and oil primer. This is also done on the first day. Any new moldings or panels inserted have been previously painted, so that only in rare instances is new wood encountered. Under a separate heading will be found a description of the painting from the raw wood up. On the second day, the car is given a coat of red enamel, cutting around numbering, lettering, and other decorations. Following the coat of enamel the car is given one coat of finishing varnish on the third day. In some instances, where cars are in good condition, with the surfaces not scratched or marred, it is possible to varnish the car without a coat of red enamel, and this saves one day. After standing for 24 hours the car is ready to receive



A portable scaffold has been found particularly efficient when painting monitor sashes and side roofs

seats, window screens, Hunter sign curtains, and other trimmings. On the fifth day the car is ready to be returned to service.

As soon as the exterior has been cleaned (usually the second day) the cleaners begin work on the interior of the car. Here great care is required. The use of acid is eliminated entirely and only upon exceptionally dirty spots is soap used. The work is begun on the ceiling, working down the sides of the car to the floor. The interior cleaning includes underside of hoods and vestibule ends. Accumulations of dirt, paper, etc., under longitudinal seats and such places are removed. After the interior cleaning has been finished, the paint shop foreman or his assistant examines the car and decides whether the interior condition warrants renovation or revarnishing. Should the varnished surfaces appear in good condition a special renovating oil is employed. If, on the other hand, the surfaces appear dull and unattractive, the car is varnished. The interior of the vestibule ends, however, usually receives such hard service that it is found desirable in nearly all cases to repaint the woodwork, using a solid color, imitation mahogany or natural cherry finish. Seat pedestals are bronzed; stanchions, hand brake supports, etc., are then painted or enameled, and finally, on the same day that the car is given a coat of clear varnish, the floors are painted, so that both are drying simultaneously. Before the car is put back into service, all the windows are cleaned carefully and the excess paint is removed with the use of an old razor blade.

### Painting from the Raw Wood Up Requires Special Treatment

The practices followed on a car from the raw wood up differ from those already described. To the raw wood is first applied a primer made of two-thirds raw linseed oil and one-third pure whitelead. This is colored pink by the addition of a small amount of Tuscan red. After this has been allowed to stand 48 hours it is sanded with No. 1 sandpaper. Then the second coat of primer made of half linseed oil and half whitelead, which has also been colored, is put on. This second coat is allowed to stand 24 hours and is then sanded with No. 1 sandpaper. The third coat of surfacer consists of one-third linseed oil and two-thirds whitelead, colored as previously described. This third coat, after being allowed to stand, is likewise sanded.

Generally speaking, there has now been provided a good, smooth surface. If, however, a still better surface is desired, a knifing coat of lead with a small amount of oil and turpentine is then used, which, after standing 24 hours, is smoothed down very carefully with No. ½ sandpaper. There is then applied a red undercoating, which is a quick drying, non-sanding surfacer. The next coat is the red body enamel. This is allowed to stand 24 hours and then the numbers, lettering, and other decorations are applied. Following this, the car is given two coats of finishing varnish with 24 hours between for drying.

The result of sending cars to the paint shop every twelve months is that very few cars require such treatment. The burning off of old paint under these conditions is also very rare.

The present paint-shop force includes one foreman, one assistant foreman, one inspector, twenty-two first-class painters, sixteen second-class painters, six third-class painters, three fourth-class painters, one first-class helper, five second-class helpers and twenty women.

### One Hundred Cars a Month Painted in Baltimore

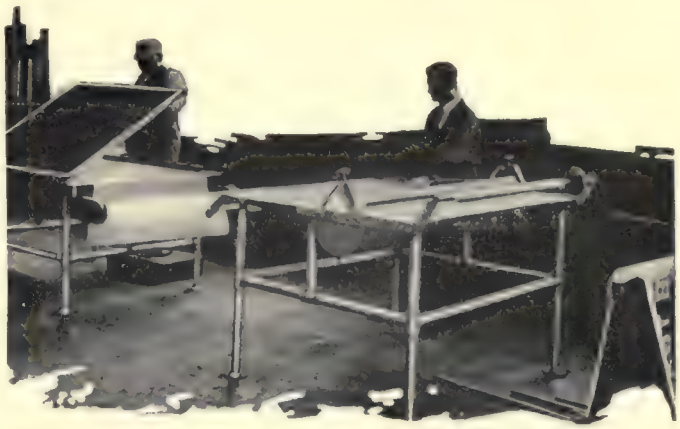
The total number of passenger cars on the system is approximately 1,200 and with an average output of 100 cars per month it is possible to send every car through the paint shop each twelve months. The paint-shop force also does a great amount of work in painting automobiles, trucks and bus bodies. During 1926 a total of 49 were painted in addition to the cars. Considerable painting is also done by this force of all kinds of signs, also waiting stations and office sections of buildings. A quite extensive rerouting of cars resulted in making changes of more than 1,000 Hunter sign curtains.

Painting records show that the following are fair estimates of cost: To paint the exterior and varnish the interior according to the old methods, including numbering, lettering and striping in vogue at that time, would cost on today's rate of wages and price of materials between $250 and $275 per car. To bring up a car from the raw wood following present-day practice

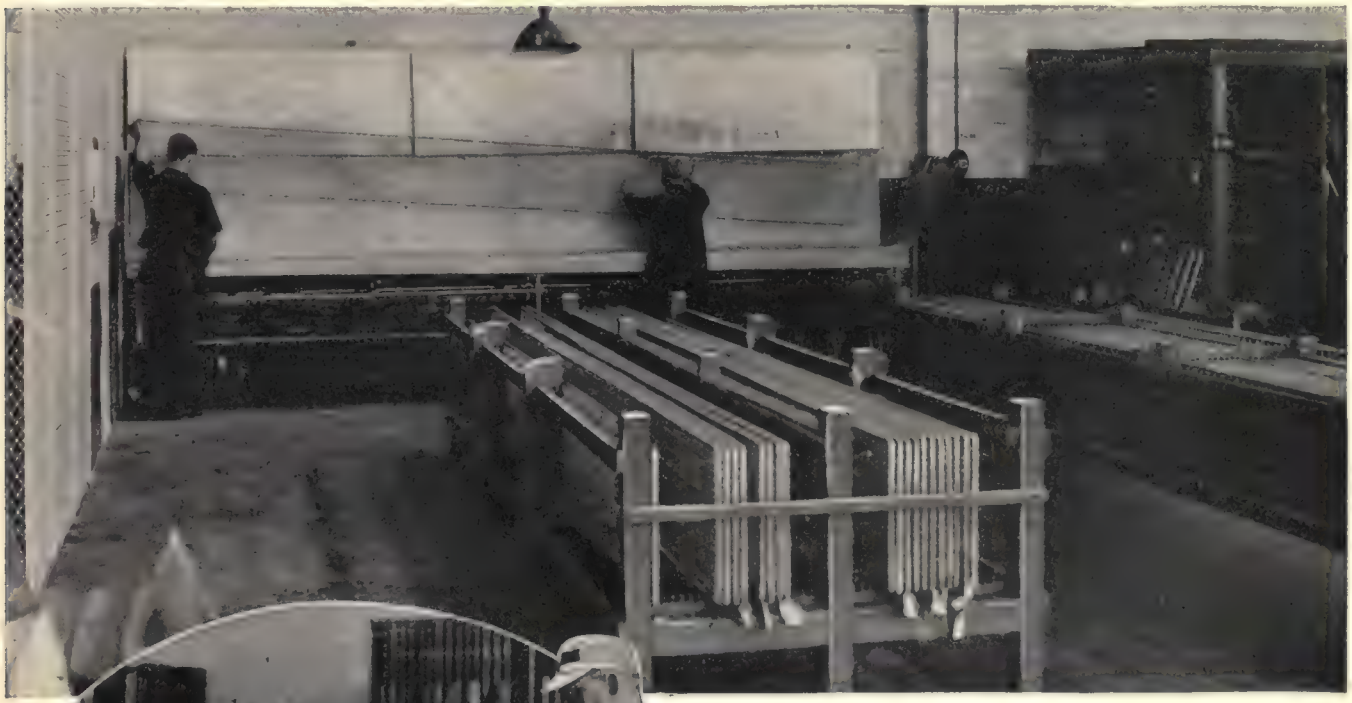
would cost about $125. To clean down, touch up and revarnish, including one coat of enamel and one coat of varnish, costs on the average of $60 per car. The present standard practice eliminates the two colors and striping.

Formerly the side window screens were given one coat of aluminum bronze. Investigation of this detail indicated the need for some quicker method, such as dipping the screen in a shallow pan of paint. As aluminum bronze separated in a very few minutes, it was difficult to keep the material in a homogeneous condition. Finally a scheme was devised to use a gray-colored paint generally similar in appearance to aluminum. Screens can now be dipped in a few minutes. By doing a large number at one time still further economy is possible.

The frequent repair, replacement and making of new Hunter sign curtains indicated the need for a change



**Printing arrangement and device for impregnating Hunter sign cloth with oil to make it impervious to water. This is necessary to prevent buckling and wrinkling**



**Two men dipping side window screens**

The screen has just been placed in the gray paint and has been lifted out and is about to be hung on the rack above the dipping table so that the surplus may drain off. After several screens have been dipped and allowed to drain for a few minutes, a dry brush removes the surplus paint. The screen is then placed in the rack seen in the forefront of the picture. Hanging from the corner of the screens is a tag which shows the number of the car to which the individual screen belongs.

**Silk stencil method of making Hunter signs**

One section of a Hunter sign has just been printed and the workman is lifting the silk stencil off the freshly-painted sign. This section is then cut loose from the roll of cloth and the fresh strip of cloth is drawn under the frame. The frame is then clamped down and another sign painted.

from the slow hand method. A careful study of the use of silk stencils has shown that this work can be done at small cost with great speed. A recent example was occasioned by the need of signs for trolley poles indicating the proper stopping point for cars, as the result of eliminating stops during rush hours. Approximately 1,500 signs were required to be delivered in approximately ten days. By the use of a silk stencil and the dipping of the sheet metal on which the working was applied, it was possible to turn out these signs with lettering on both sides within one week.

In the foregoing, the work that has been covered has been done by the brush method. Nevertheless, numerous experiments have been made to accomplish this by use of spray methods. Owing to the excessive amount of vapor the results have not been satisfactory. Complaints arose from the workmen in the vicinity. With the use of lacquers this is even more pronounced. It has also been found that lacquers do not work out satisfactorily on woodwork, and as the greater portion of the cars have wood surfaces lacquer has not been considered seriously. It is believed that there is need for

considerable investigation of this problem, especially along the line of producing a spray gun which will atomize the paint, varnish or lacquer, but will control the spread of the finely-divided particles. So far, the use of spray painting has been confined to the painting of large surfaces, such as walls, partitions of buildings, car body trucks and generally where the fumes would not be of extreme annoyance.

Experiments and tests have also been made with the use of long oil enamels. Generally speaking, these results have not been at all satisfactory because of two conditions. First, there is a longer and uncertain period required for the drying. Instances have occurred where as long a time as five days was needed for a single coat to dry. Secondly, without a coat of varnish over the coat of enamel, great care must be exercised in the kind of cleaners used at terminals. It has been found that such enamels are injured by any acid cleaners.

The company has for its heavy service lines quite a number of front-entrance cars of the Birney safety type and articulated cars arranged for front entrance especially designed by the railway. In order to acquaint the riding public with cars that load at the front, all front-entrance cars are painted in cadmium yellow, the rear-entrance cars using the standard red color.

### Records of Paints Used Kept by Glass Samples

The need for records on paints of different kinds is met by providing a small cabinet holding a large number of pieces of glass approximately 3 in. x 5 in. in size on which samples of any new paints are placed, together with an identifying number and a record of who furnished and when. This makes it very easy to check up on the delivery of paint materials as to body and color. Samples are also kept in a similar manner of paints made in the paint shop, with the formula, so that at all times such materials can be reproduced exactly as to color and general consistency.

The liberal use of paint in the paint shop is encouraged with the view of keeping a clean, fresh and attractive appearance. It is believed that such expenditures, although small, have a beneficial effect upon the morale of those working in such surroundings. It also produces an inviting atmosphere to those who, upon occasion, visit this part of the railway system.

Since the war, the greater portion of the car cleaning preparatory to painting on our system is being done by women. This was brought about by the shortage of man-power. Women are also employed in the paint shop to clean windows preparatory to sending the car out for services.

Constant tests of paints, oil and varnishes are being made under supervision of the foreman of the paint shop, usually in the form of test panels. These test panels are prepared carefully under his supervision and a record of the materials and their method of use carefully noted. The test panel is then numbered, dated and placed out for exposure. Removal of test panels is not permitted without instructions from the superintendent and a record is made of the conditions upon removal. Generally speaking, paints are exposed for twelve months, and varnish and similar materials for eighteen months. Color combinations are under constant consideration, with the view of obtaining an attractive color scheme with a cost equal to or less than that existing at present.

## Poor Tools May Cause Injury

POOR quality tools, good tools impaired and the improper use of tools account for about 11,000 casualties yearly among railroaders of the United States. A study of "tool accidents" on a single representative railroad has disclosed that 89 per cent of injuries are chargeable to tools. They come under four leading causes: Struck by tools in hands of self or others, 33 per cent; bars slipping, 25 per cent; jacks slipping or falling, 16 per cent; wrenches slipping, 15 per cent; various other causes, 11 per cent.

In one year there were 3,868 compensated accidents recorded in New York State, each caused by the misuse of hand tools, or defects in such tools—proof that safety is of vital importance to the user of tools.

Slight yearly reductions in the annual toll from tools used carelessly indicate a lessening of the general hazards, but the fact that tool accidents are mostly confined to shops, stores, tracks, bridges, and buildings where men work in groups under the close surveillance of their foremen and where safety supervision is easy to provide, makes it evident that a greater improvement is possible with better co-operation between workmen and foremen. Tool accidents will decrease to the extent that supervision and co-operation become effective.

Burred and feathered chisels and sledges, hammers and shovels that are loose on their handles, wrenches with spread or worn jaws and jacks with defective ratchets are an index to the efficiency of those who use them as well as to those who supervise the work in which they are being used.

Improper use of tools, even though dangerous, will be discontinued only when foreman and workmen have a mutual understanding that such practices will not be tolerated. To be effective it must be understood by all that the foreman's instructions are to be enforced, and that if necessary the workman who refuses to abide by them will be disciplined.

## New Shops of Chicago Rapid Transit Company Will Occupy 15 Acres

TEN separate shop units are planned by the Chicago Rapid Transit Company to be located at Niles Center. They will cover upward of 15 acres and are laid out and connected with each other so as to afford the utmost efficiency in handling cars. When the elevated railroads were operated as four separate companies each road had its own shop and there was no provision for an interchange of equipment. That condition had to be continued as a matter of necessity after the companies were consolidated. When the new shops now under construction are completed they will have a capacity sufficient to care for all the present equipment, and provision is being made for adequate expansion. The present shops will be used for purposes of inspection and minor repairs.

Work on the first unit of the shops is progressing rapidly and it is expected that it will be completed in May. This unit is the paint shop. It will be followed by other units from time to time until all of the shops are completed. The building now under way is 200 ft. by 224 ft. in outside dimensions. The walls are of Old English mission brick with cast stone trimmings. All of the buildings to follow will be of the same design. This will give them an attractive appearance, in keeping with the neighborhood.

# *Glimpses into the new*

# B.-M. T. Repair Shop

AN ELECTRIC RAILWAY SHOP equipped completely with the latest machine tools and other modern equipment is an inspiration to men responsible for electric car maintenance. Such an example is furnished by the new DeKalb Avenue repair shop of the Brooklyn-Manhattan Transit Corporation.

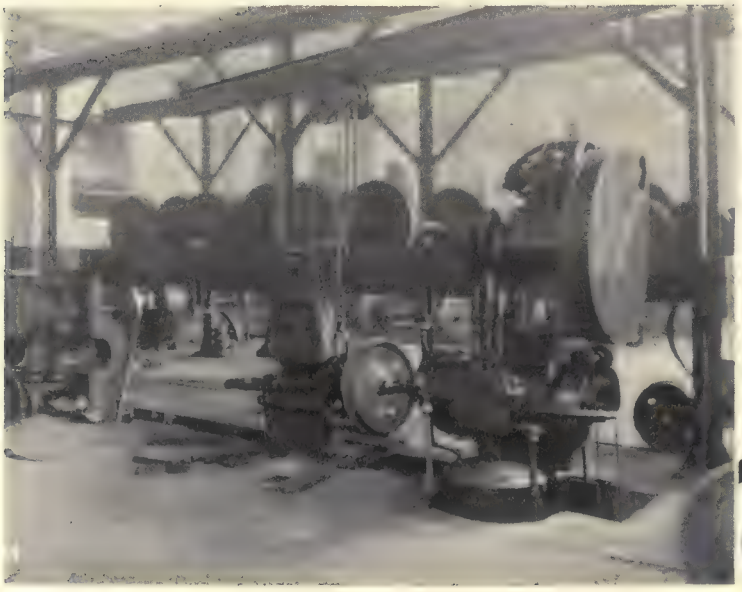
Prior to June, 1926, all maintenance work on surface cars for both the above corporation and the Brooklyn City Railroad was consolidated under one head. The separation of this work for the two companies made it necessary for the Brooklyn-Manhattan Transit Corporation to have increased facilities. The DeKalb Avenue shop was rebuilt and enlarged and the very latest shop equipment that could be obtained was installed.

Like other officials of city railway systems, those of the Brooklyn property felt that suitable facilities and shop equipment for maintenance work are essential to safe and reliable car service. Particular attention was given to the selection of machine tools. Experts studied the various machining operations that are necessary for car repairs, improvements were added and several special machines were built by manufacturers to meet the specific class of work. Each machine is provided with individual electric drive. Work and materials can pass through the shop without delay, floor space can be used to the best advantage and any congestion at one machine does not interfere with independent operation of another.

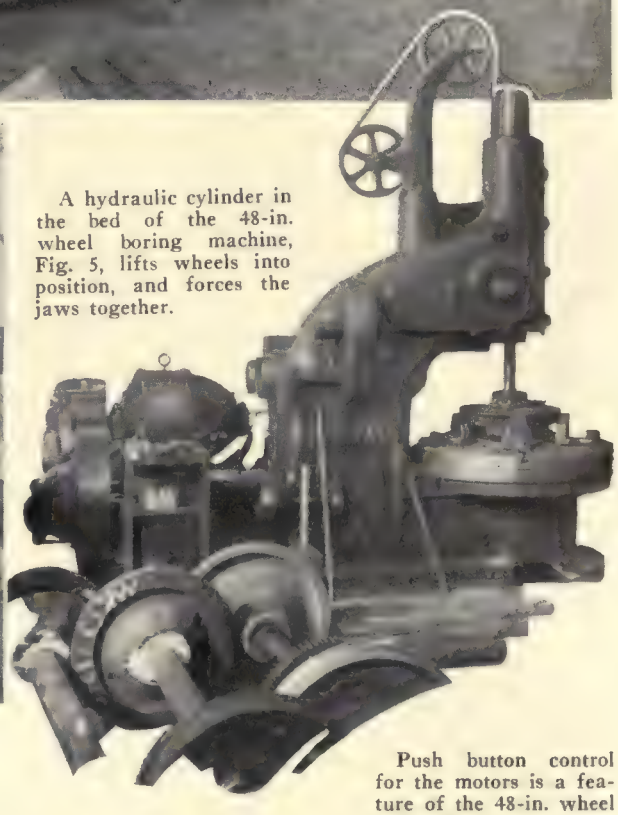
The accompanying illustrations show some of the apparatus of this extensively equipped shop. At the top of this page one of the 10-ton cranes is shown serving the hydraulic wheel press. A general view of the truck overhauling bay with the machine shop at the rear is shown below.

# *The* Wheel and Axle Department *is a busy section*

The helical geared ball bearing lathe, Fig. 3, is used almost entirely for turning armature shafts. It is large enough to take the broom shafts of sweeper equipment.

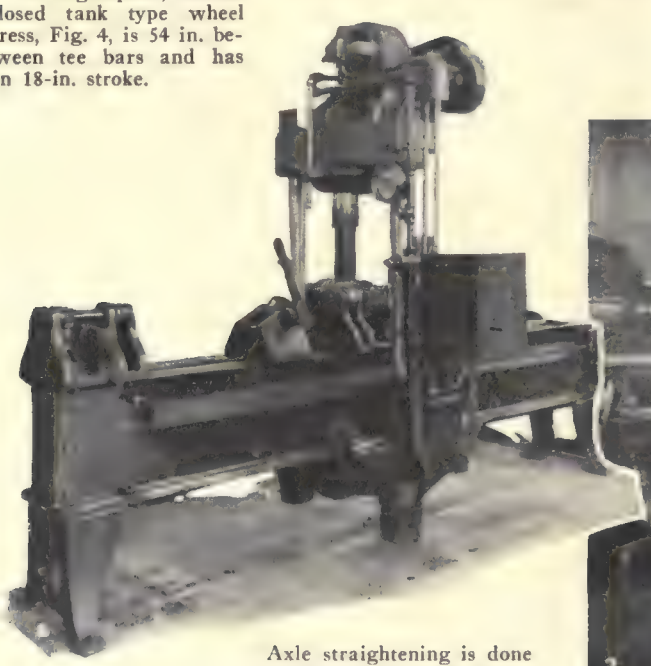


The high-speed, 300-ton closed tank type wheel press, Fig. 4, is 54 in. between tee bars and has an 18-in. stroke.



A hydraulic cylinder in the bed of the 48-in. wheel boring machine, Fig. 5, lifts wheels into position, and forces the jaws together.

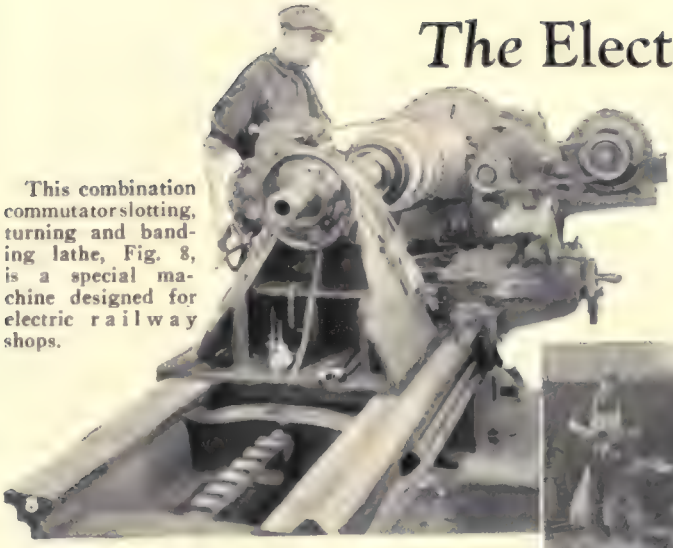
Push button control for the motors is a feature of the 48-in. wheel lathe, Fig. 7.



Axle straightening is done in the 125-ton hydraulic press, Fig. 6.

# *The* Electrical Repair Department

## *is completely equipped for maintenance of all motor and control apparatus*



This combination commutator slotting, turning and banding lathe, Fig. 8, is a special machine designed for electric railway shops.

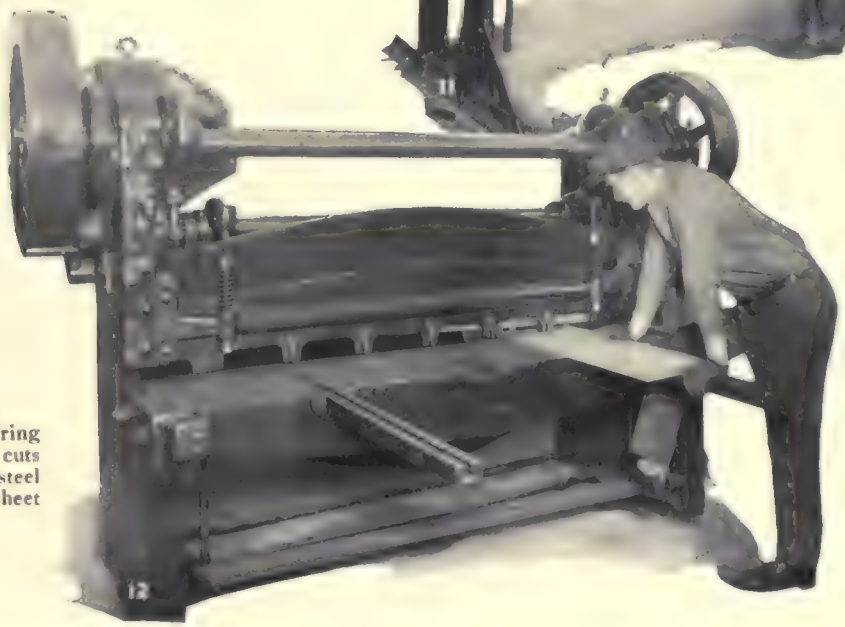
Conveniently arranged armature stands facilitate work of rewinding, Fig. 9.

The baking and drying ovens, Fig. 10, have thermostatic heat regulation and clock control for turning off the heat.

*Steel car repairs require*

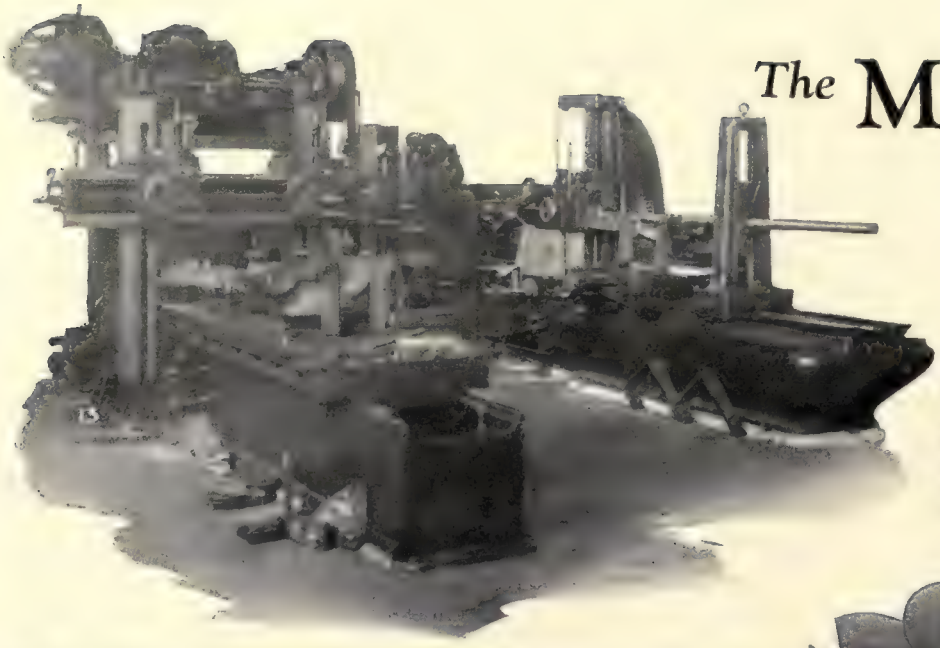
## Modern Sheet Steel Machines

A hand bending brake shapes sheet steel for splash guards and sand boxes, Fig. 11.

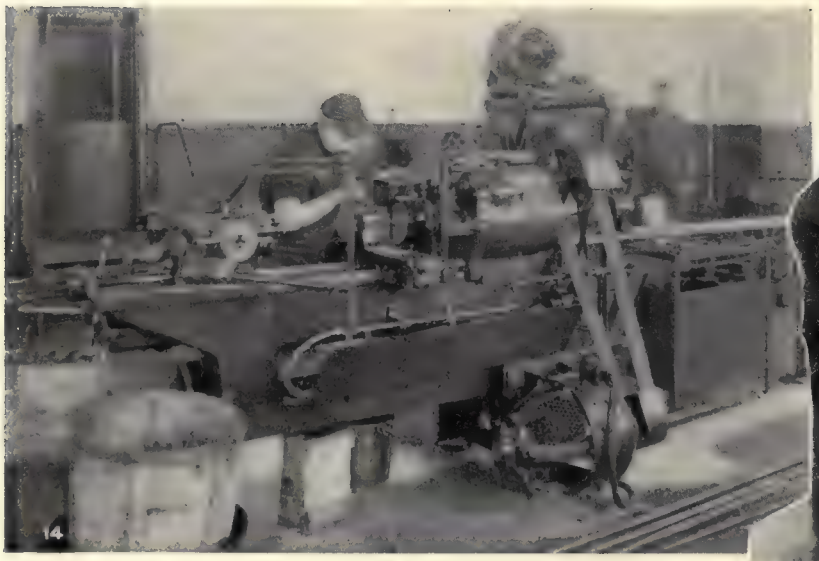


The power squaring shears, Fig. 12, cuts side sheets for steel cars and other sheet metal work.

# *The* Machine Shop

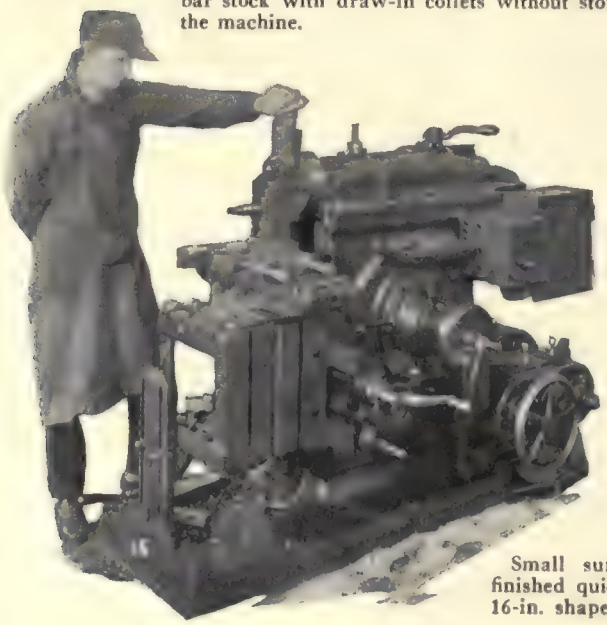


Surfaces of motor shells, gear cases and truck frames are finished on the planer in the foreground, Fig. 13. A motor shell is being rebored in the horizontal boring mill in the rear.



Bushings and pins are made economically on the universal turret lathe, Fig. 14, which feeds bar stock with draw-in collets without stopping the machine.

Motor shells and truck frames can be clamped permanently when drilled in the radial drill, Fig. 15.

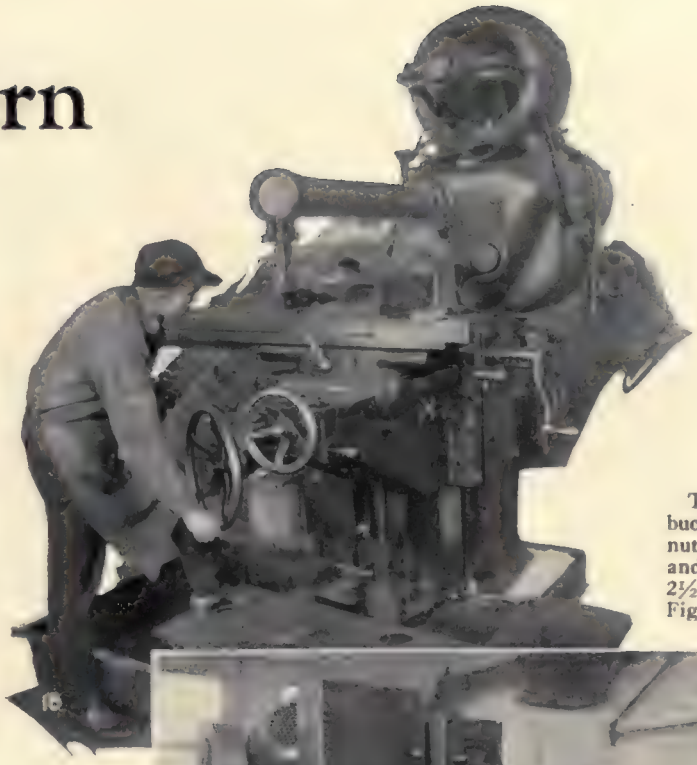


Small surfaces are finished quickly in the 16-in. shaper, Fig. 16.

The friction of a disk on the pulley of the grindstone, Fig. 17, rotates a pump to supply water for wet grinding.

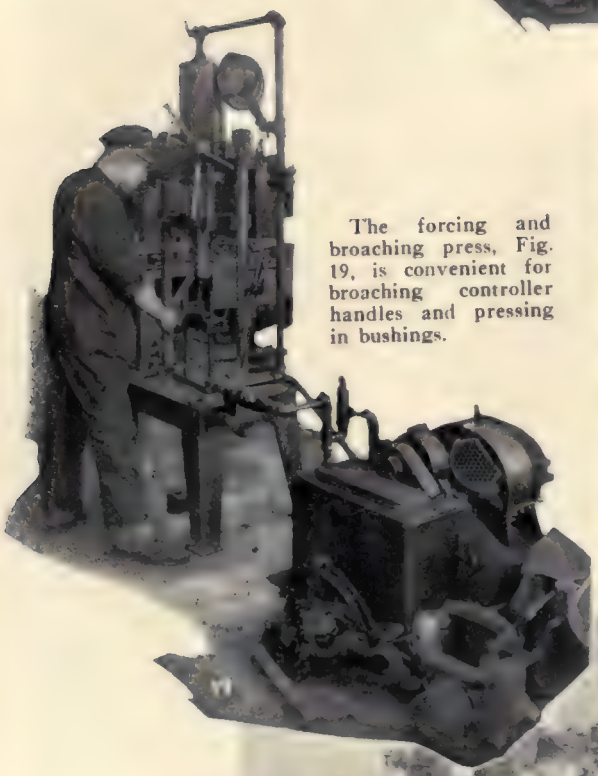
# s Most Modern

*To maintain and repair cars speedily and keep them up to the modern standards of excellence a completely equipped machine shop was installed*



Axle caps are bored with a special jig in the universal milling machine, Fig. 18.

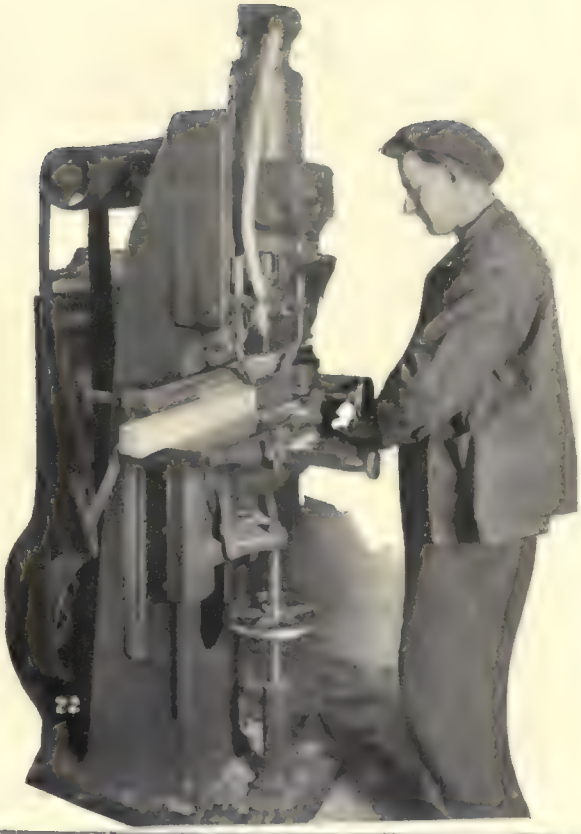
Truck bolts, turn buckles and special nuts are threaded and tapped in the 2½-in. bolt cutter, Fig. 20.



The forcing and broaching press, Fig. 19, is convenient for broaching controller handles and pressing in bushings.

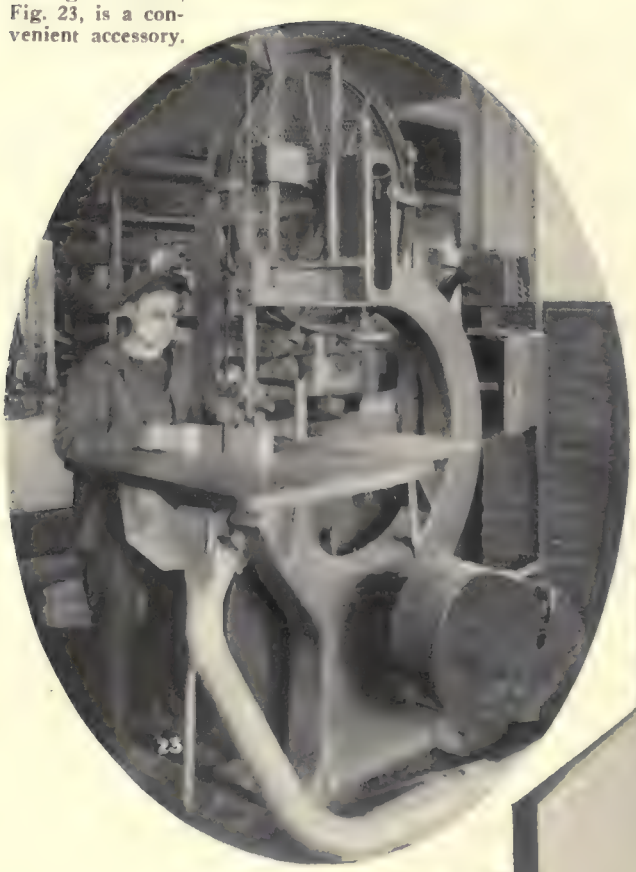
Turning of car axles is done quickly on this lathe, Fig. 21.

# *Modern*
# Wood-Working Machines
## *eliminate much hand work*



Stiles and rails for sash and doors are mortised on this automatic vertical hollow chisel mortiser, Fig. 22. It has a power stroke for the chisel ram.

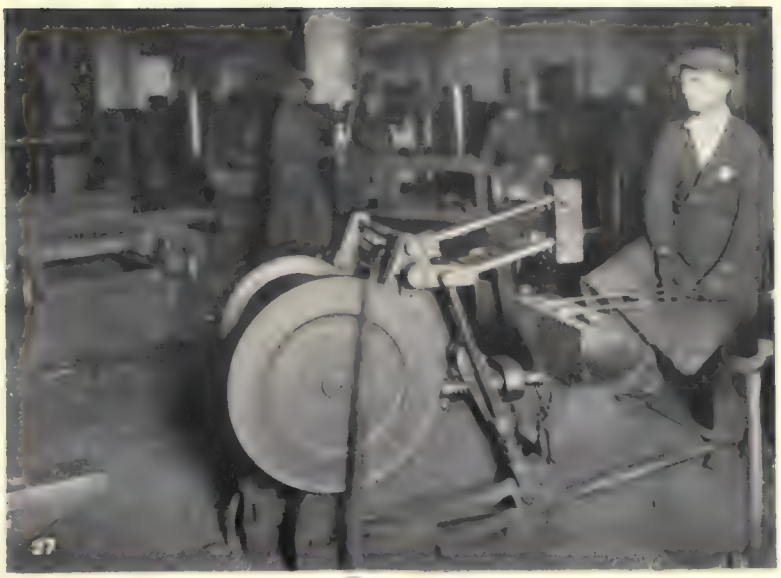
The 36-in. band, scroll and rip sawing machine, Fig. 23, is a convenient accessory.



This four-spindle boring machine, Fig. 24, has a vertical adjustable table.

Material is cut quickly into slats and narrow widths on the automatic self-feeding rip saw, Fig. 25.

The oil burning furnace, Fig. 26, is used for heating heavy pieces with a long surface.

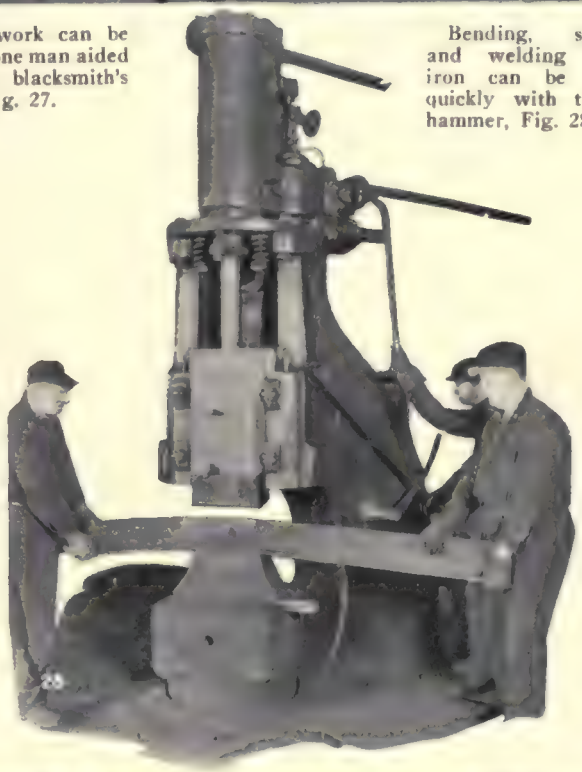


Small work can be done by one man aided by the blacksmith's helper, Fig. 27.

Bending, shaping and welding heavy iron can be done quickly with the air hammer, Fig. 28.

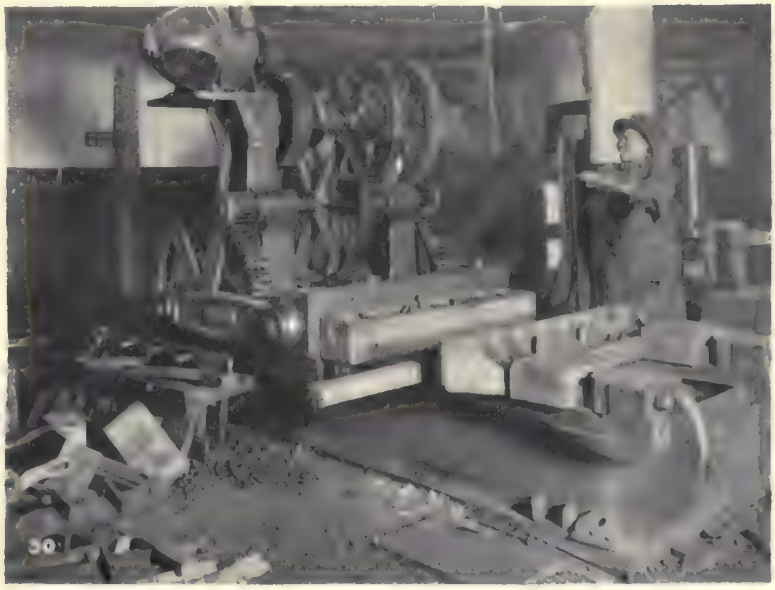
# Forge Shop Equipment

## *is suited to light and heavy work*



Bending and pressing are essential operations of the bulldozer, Fig. 30. It is used also for testing the compression of heavy springs.

Rods, angles, and other small pieces are heated in the forge, Fig. 29.

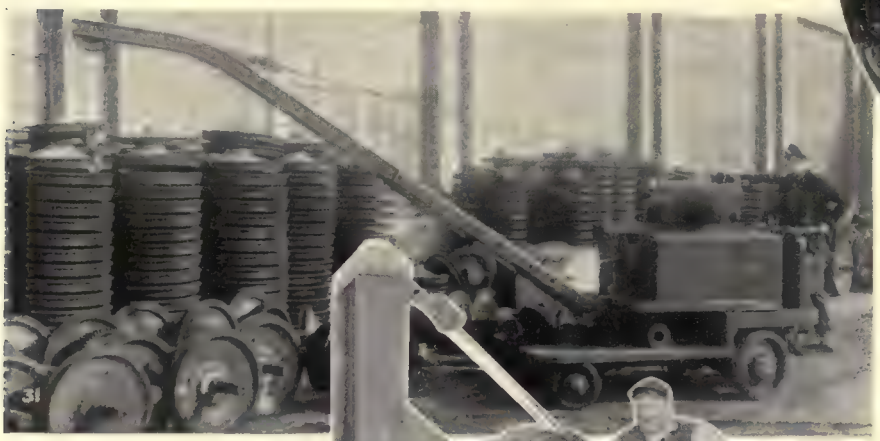


# Electric Trucks *are a great convenience for material handling*

A crane truck, Fig. 31, handles heavy parts in the material storage yard.

Small material is moved quickly by trucks, Fig. 32, with stationary platforms.

Controllers, compressors and other car equipment can be placed on work benches by one man with the elevating platform truck, Fig. 33.

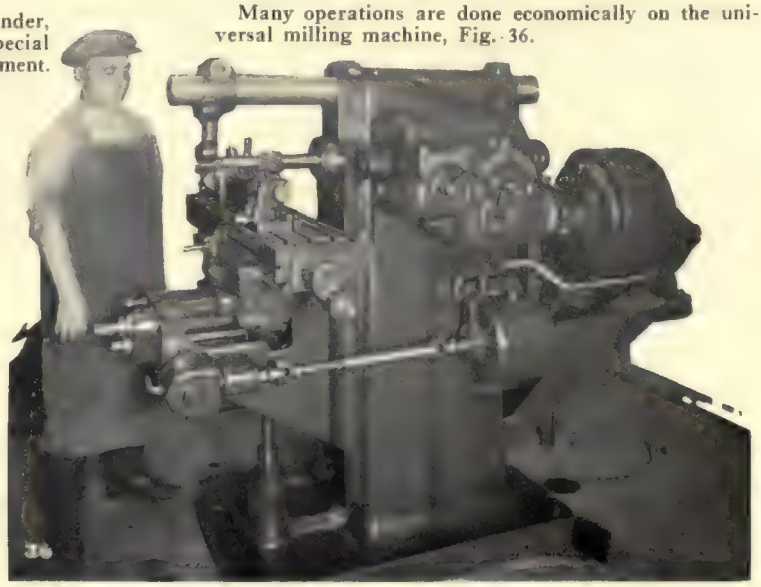


# The Tool Room *one of the shop's show places*

Cylindrical, internal and surface grinding are done on the universal cutter and grinder, Fig. 34.

Many operations are done economically on the universal milling machine, Fig. 36.

The twist drill grinder, Fig. 35, has a special wheel truing attachment.



# Electrical Maintainers Are Not Trouble Men

## Successful Maintenance Should Keep Property and Equipment in Such a State of Repair that There Are No Reports of Trouble—Rigid Inspection at Regular Intervals Has Produced Gratifying Results in Chicago

**By Dwight L. Smith**

**Electrical Engineer Chicago Rapid Transit Company, Chicago, Ill.**

PROBLEMS in electrical maintenance that require daily solution on the lines of the Chicago Rapid Transit Company are quite different from those of the average city property, but similar procedure and organization can be used by most railways. The route-miles operated total 77 and the single-track miles 217. As most of the track is on elevated structures with third rail and as there are 224 passenger station buildings and an extensive private telephone system maintenance work is quite varied in character.

The electrical department is responsible for all electrical maintenance except that of rolling stock, signals and interlocking. The principal items include the following:

| | | |
|---|---|---|
| Third rail | 200 | miles |
| Overhead trolley | 17 | miles |
| Telephone cable | 66 | miles |
| Telephone instruments | 575 | |
| Feeder cable, underground and overhead | 286 | miles |
| Street and yard lights | 1,010 | |
| Electric sign lights | 1,560 | |
| Station and building lights | 27,130 | |
| Storage batteries (railroad) | 6 | |
| Substations (owned by railroad) | 5 | |

Despite the magnitude of this task it is accomplished with a force of less than 50 men and the property is not only well maintained but its physical condition is being bettered continually.

Some years ago these maintenance workers were called "trouble men," with the natural result that they believed their work was to take care of only such trouble as was reported. Now the word "trouble" is taboo, the men are known as "maintainers" and their efforts are directed toward keeping property and equipment in such a state of repair that there are no reports of trouble.

A thorough system of inspection is a big factor in approaching this goal. Every item in every location is given a rigid inspection at regular intervals, varying from once a day to annually, based on the type of property and the location. This system is laid down in detail in the inspection manual with which each maintenance foreman is furnished and which he uses as a text book to school his men. In the manual there is a division of the property into classes and groups and the railroad is classified into zones, according to the density of traffic. A definite interval for inspection is assigned for each class and group of property, varying with the zone; for instance, subway lights and signs are inspected daily, third rail in the central zone bi-weekly and bonding in yards annually.

On some classes of inspection, principally those which come at longer intervals, the exact dates are left to the discretion of the foreman to fit in with his work.

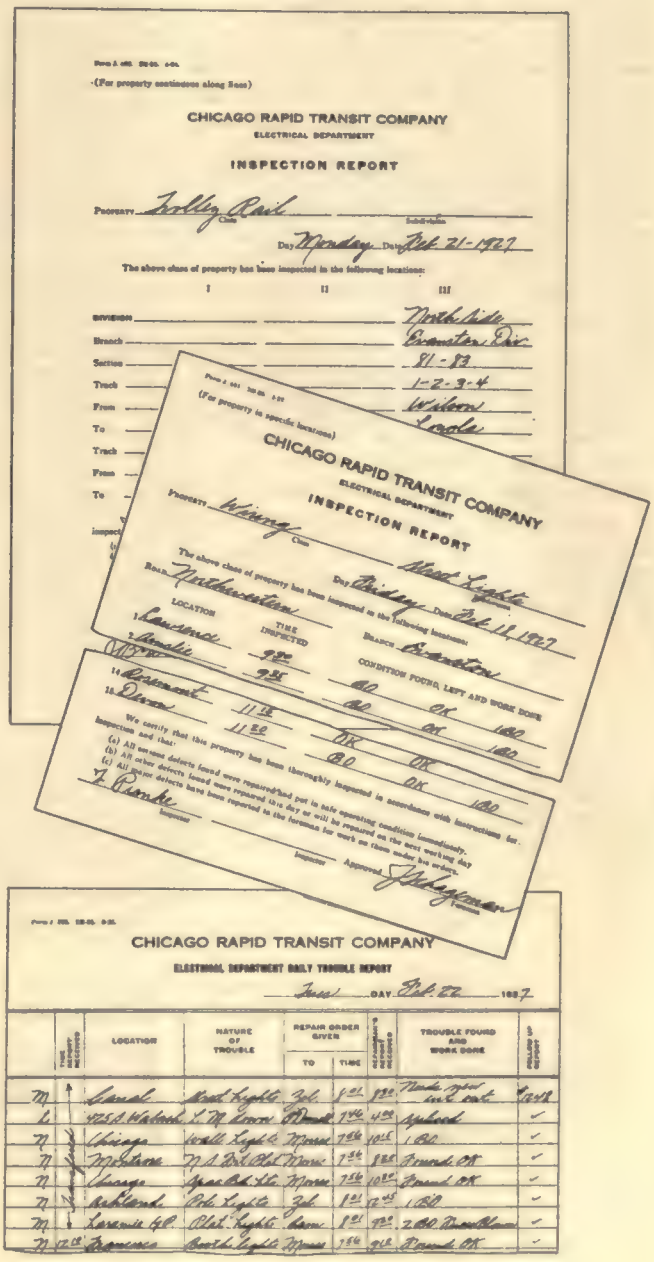



Fig. 1 (at top)—Inspection report used for property along lines

Fig. 2 (in center)—Form used for reporting results of inspection

Fig. 3 (at bottom)—The trouble sheet serves as a permanent record of cases as reported

Otherwise a schedule of dates for each inspection is published periodically in a bulletin, and no deviation from them is permitted. This is notably the case with trolley wire, where inspections must be made at night and where both foremen and inspectors were prone to postpone the date if any reasonable excuse offered. Now no excuse is deemed adequate.

Not only does the manual assign regular periods for inspection but it includes a catechism for each class and group of property. A series of questions indicates what possible faults are to be looked for and the answers tell what is to be done when any of these faults are found.

The inspectors in general do the maintenance work. Small faults found by them are repaired on the spot. Larger faults are reported to the maintenance foreman, who arranges for the necessary men and material for the repair. Faults too large to be taken care of by the maintenance forces are reported by the foreman to the office for inclusion in the construction schedule. The seriousness of any fault discovered determines the celerity with which it is repaired. Emergencies are reported immediately by telephone and the necessary men and material are despatched at once.

Reports of routine inspections are made out by the inspectors, approved by their foreman and forwarded to the office, where they are noted by the electrical superintendent and then recorded. This record shows the dates of inspection of each class and group of property in each location. A frequent check-up serves to show whether inspections are being kept up to the required interval. The forms used in reporting inspections are shown in Figs. 1 and 2.

In line with the policy of prevention is the practice of anticipating possible trouble caused by necessary interference with electrical property by the work of other departments. This information is given through an exchange of work orders, by written and telephone reports and by close liaison between the supervisory forces of the departments. In some cases the interference can be eliminated temporarily while work is going on. A close watch always is kept and inspections are made more frequently than normally.

Maintenance men are grouped into gangs of from six

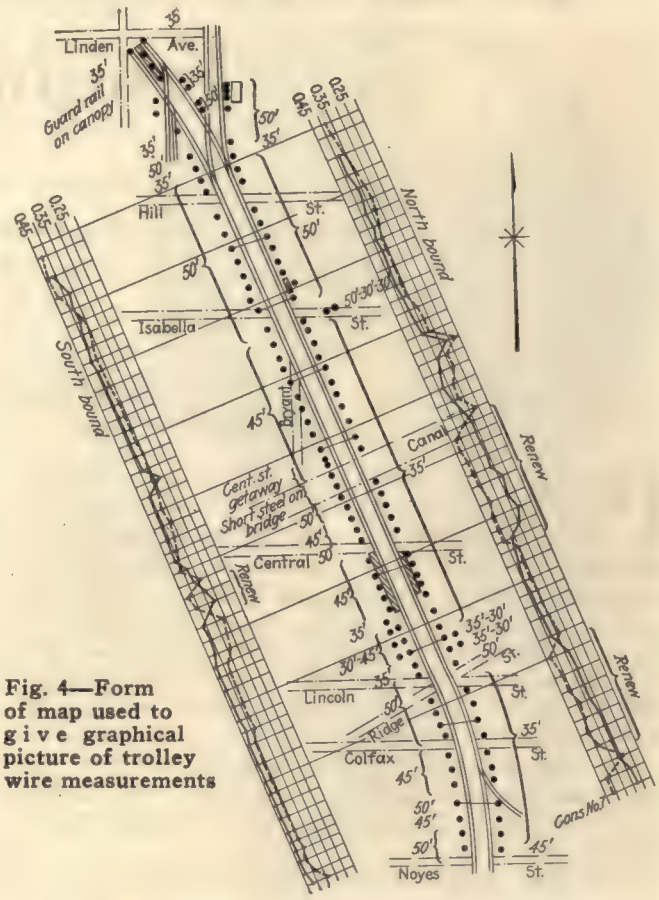



Fig. 4—Form of map used to give graphical picture of trolley wire measurements

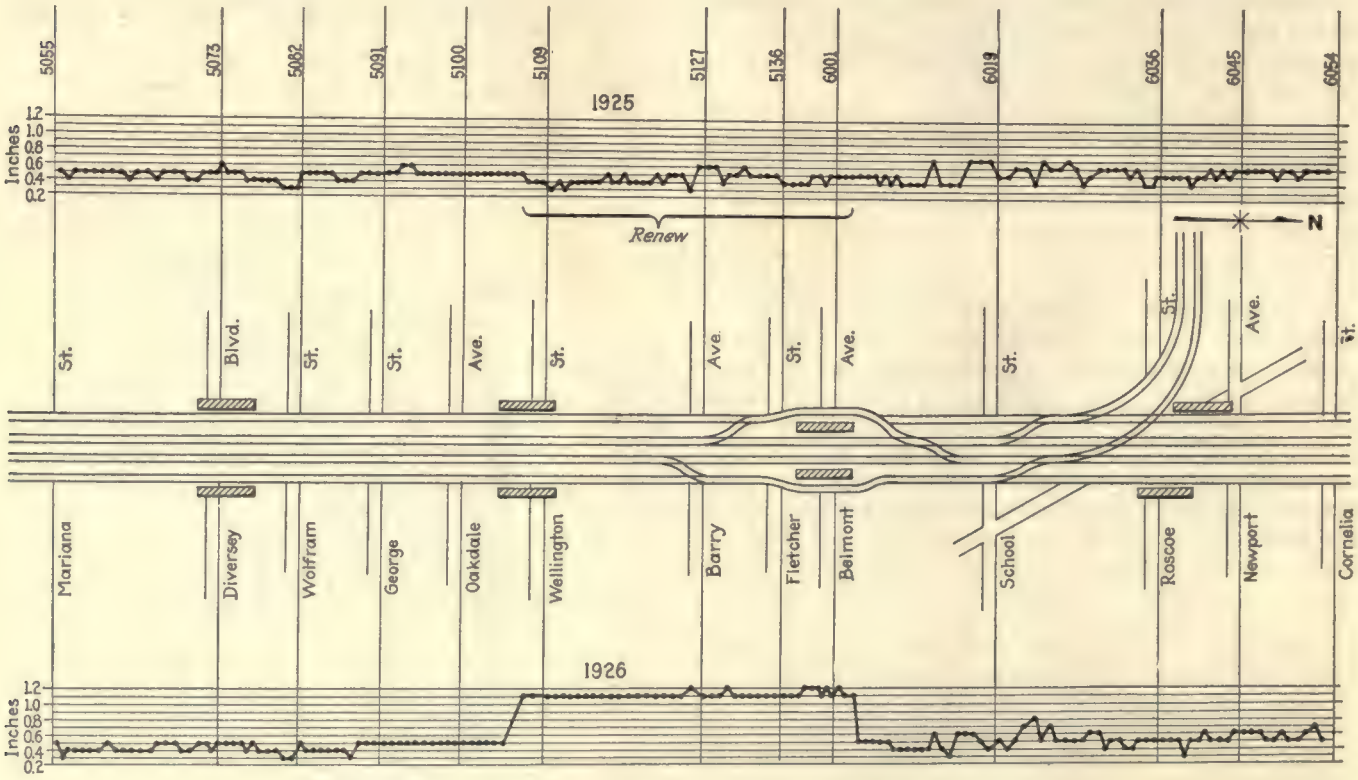



Fig. 5—Map and graphs are used to show third rail measurements

The maintenance shops serve as headquarters for the men—they report and quit work at the shop

The illustration at the left shows method of measuring the thickness of head of the third rail

to eight, each in charge of a foreman. There are five such, one for third rail, one for telephone, one for cable and one for line work, small wire and lighting. These four gangs not only do maintenance but minor items of construction, and work over the entire system. Each has a maintenance shop as its headquarters and as the men work one place today and another tomorrow, they report and quit at their shop. Each shop is equipped with the necessary tools and a working stock of material which is taken out as needed.

The fifth gang includes the maintainers, who are assigned to divisions and branches of the road and who, in general, work singly, but are always on hand in their assigned territory. A large part of the work of these men is replacement of burnt out lamps and taking care of trouble as it is reported, but in spite of this, the term "trouble man" is avoided and they are known as "maintainers." Each of these men has a headquarters at the geographical center of his territory. There he keeps his necessary small tools and stocks of lamps and material, arranged neatly in steel cases. The foreman of this group acts largely as an inspector, spending time with each of his men in turn, checking up their practices and standardizing their methods. He is responsible for keeping their headquarters supplied with the necessary stock of materials, which are ordered from and delivered by the electrical materials man.

The first four gangs mentioned are on duty only during regular working hours. The fifth one not only has a day shift but has a second shift of two men who are on duty up to 1 a.m. with a consolidation of territory. Between 1 a.m. and 8 a.m. the small amount of maintenance necessary other than that regularly scheduled is cared for by men acting in the dual capacity of signal and electrical maintainers.

The costs of maintenance work of each class are kept by the cost clerk on maintenance work orders. These cover twelve-month periods ending Oct. 1 so that the data are ready for use in making the budget for the succeeding calendar year.

The power supervisor acts as work dispatcher and clearing house for all electrical trouble. He can reach by telephone every point on the system. All foremen and maintainers keep him informed as to their whereabouts, all electrical trouble is reported to him and he can reach the proper personnel quickly to cover any emergency. The territorial maintainers are directly under his control at all times, receive from him trouble assignments in their territory and report back on each case and to get their next assignment. A "trouble sheet" kept by the power supervisor serves to record cases as reported, designates assignments and "OKs" with the time that the order is given. This becomes a permanent record kept on file for three years and to which reference is frequently made. This is shown in Fig. 3.

The maintainers on the afternoon trick have a large territory and skillful routing by the power supervisor

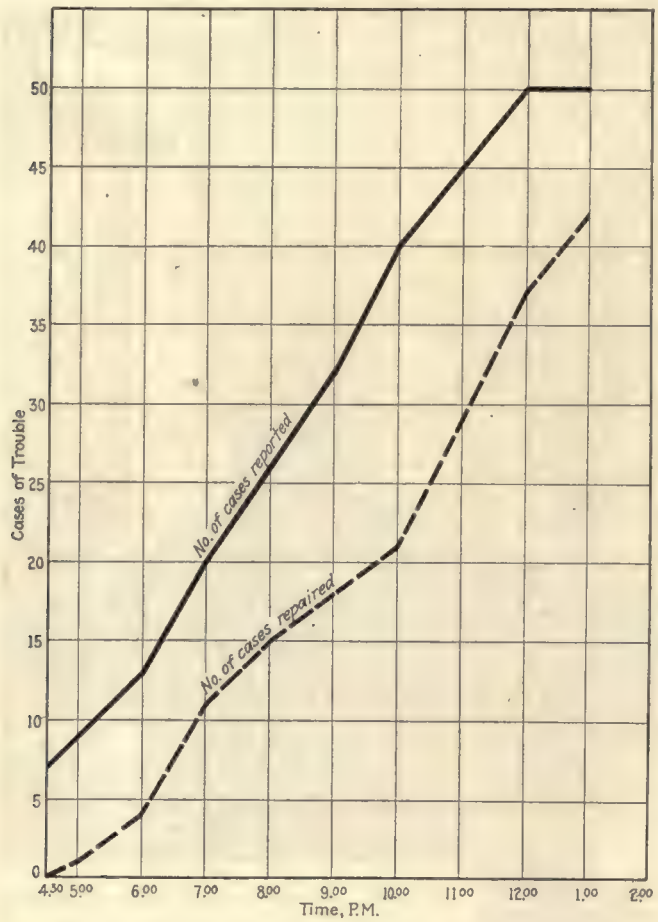



**Fig. 6—Graph gives a continuous record of cases reported and repaired**

is necessary to enable them to cover all reports. He keeps a graph of the number of defects reported and repaired. Fig. 6 gives such a graph. This is of value to provide a constant picture of how the work is progressing.

Sometimes the territorial maintainer can make only temporary repairs which are safe enough for operation for a few days. When such repairs are made a "follow-up slip" is filled out by the power supervisor and sent to the foreman of the appropriate maintenance gang, which makes the repair permanent.

The Chicago Rapid Transit lines are a consolidation of five properties, each of which originally used a different standard of construction and materials. Since the consolidation universal standards have been laid down to which all new construction and rehabilitation conform. Many of the old parts must still be kept in stock for maintenance, which makes quite a variety of maintenance materials, but standardization is progressing gradually.

Renewals are really wholesale maintenance, but there is a definite point, determined by an economic balance, where smaller repairs should stop and larger renewals begin. In determining this point the first requisite is accurate information; estimation will not do. The service on this road is so severe that in places No. 0000 hard drawn copper trolley wire has a life of only eighteen months. To determine when renewals are necessary and their extent the trolley wire is calipered in each span with a micrometer caliper about every 50,000 wheel passes, the passes being measured by an automatic contactor-operated counter. These measurements are plotted on a map and a study of this record gives the desired information. Fig. 4 shows such a map. Where weak spots are found which do not as yet require renewal they are calipered at more frequent intervals. This plan has enabled the company to keep wire in service until worn to 40 per cent of its original area, without a wire break in 2½ years due to wear.

The useful life of the original installation of third rail is just being reached. The same method has been used to determine the necessity for renewal, the rail head being measured for thickness every rail length and the results similarly plotted. The gage used for this measurement was designed and built by the department. It is arranged so that the operator is insulated from the rail, can place his gage on the rail without stooping and take his reading from a scale at the height of his eyes. A small clipboard attached to the upright holds the sheets on which the readings are recorded. The resulting graph is shown in Fig. 5. This method has resulted in renewals of comparatively short lengths where absolutely needed, rather than the previous practice of renewing long lengths which were estimated to require it, only to find that a part of the rail renewed still had several years of useful life.

Throughout this system of maintenance the keynote is inspection—catch the possible faults before they occur and remedy them. The result has been that delays because of electrical faults are now almost unknown, and that in spite of the continued addition of property the maintenance man-hours are steadily decreasing.

## Modern Cars and

Pneumatic apparatus must be given careful attention,
Regular and systematic care is essential.
Oil and grease will prevent abnormal wear.
Periodic cleaning will assure continuity of service;
Even the door engines should not be neglected.
Require all inspections to be of the highest type.

Men should be instructed in proper care of parts.
All valves must be carefully tested during inspection.
Instead of criticising the design, do the work well;
No apparatus will function right if maintained wrong.
The secret of good operation is good care—
Every nut, bolt and moving part should be examined,
Nothing should be taken for granted.
Analyze failures carefully to prevent a repetition,
Note the cause of each one and correct the cause.
Careless work should not be tolerated,
Even the motormen can help by proper operation.

With every man helping maintenance will be improved.
Insist on regularity of inspections, as
Long overdue inspections invite road delays, so
Let delays decrease and public friendship will increase.

Personal supervision will prove beneficial.
Running apparatus until it fails is poor practice, for
Old or defective parts should be replaced.
Vision of 100% perfect operation can be attained, and
Every management wants successful performance.

Each man will do his share if instructed properly;
Co-operation must exist. To do this
Only capable men should be used on the work and
No inferior material should be used for repairs.
Old methods of drainage are not always suitable.
Much depends on the piping arrangement;
Inspect all piping and apparatus for slow leaks.
Carefully operate all parts before return to service
And if these details are taken care of properly
Long and successful operation will be assured.

Just to the north of the main carhouse and repair shop in Chattanooga is a 70x200-ft. garage recently built by the Tennessee Electric Power Company

# Bus and Vehicle Maintenance

## Centralized in New Building

### Railway and Power Motor Vehicles of Tennessee Utility Housed in 70x200-Ft. Steel-Tile Structure—Mechanical Costs Kept for Individual Vehicles—Facilities Include Railway Type Pit with Lights Mounted in Side Recesses

**By E. D. Reed**

Manager Chattanooga District, Tennessee Electric Power Company, Chattanooga, Tenn.

WITH the opening of a new garage early this year and the working out of a system for keeping costs on individual vehicles, the Tennessee Electric Power Company is now well equipped to handle under the one roof all of its 57 motor vehicles. These include five Model Z Yellow buses, 29-passenger capacity, operated from the downtown section to outlying parts of the city of Chattanooga, and 52 trucks and automobiles. The latter include various makes and types—Packards, Buicks, Dodges, Chevrolets and Fords. The trucks are White and Federal. In this list are vehicles used by both railway and power departments, line and emergency cars, as well as official automobiles.

A site for the garage was available immediately to the north of the present trolley carhouses. As shown in the accompanying plan, the garage runs through from Market to Broad Street with two doors on each. This location simplifies the supervision, since J. R. Anderson, superintendent of railways, has jurisdiction over the garage, which is directly in charge of O. E. Nix as foreman. Under him are four day mechanics and two night mechanics with a washer on duty day and night to do oiling and greasing as well. Another employee is a boy whose sole duty is to keep the garage clean. This job we consider rather important. He is supposed to wash down the bottom of the repair pit every day and to clean up immediately any oil or grease that may get on the floor.

A repair shop feature is a 40-ft. pit with openings along the side for electric lights. The rolling steel door leads into the main storage space

The new building, which

THE TENNESSEE ELECTRIC POWER CO.

DISPATCHER'S DAILY RECORD OF AUTOMOBILES AND TRUCKS DATE ---------- 192 ----------

| | NUMBER | LICENSE NUMBER | CAR | OUT TIME | OUT Speedometer Reading | OUT DRIVER | IN TIME | IN Speedometer Reading | OUT TIME | OUT Speedometer Reading | OUT DRIVER | IN TIME | IN Speedometer Reading | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

1

THE TENNESSEE ELECTRIC POWER COMPANY

AUTOMOBILE MONTHLY COST RECORD MONTH ---------- 19...

| | CAR NO | | | | | CAR NO. | | | | | CAR NO. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LABOR COST | MATERIAL COST | GAS COST | OIL COST | TIRE COST | LABOR COST | MATERIAL COST | GAS COST | OIL COST | TIRE COST | LABOR COST | MATERIAL COST | GAS COST | OIL COST | TIRE COST |
| | | | | | | | | | | | | | | | |

2

THE TENNESSEE ELECTRIC POWER CO.

AUTOMOBILE INSPECTION AND REPAIRS

CAR NO._____ MAKE OF CAR_____ IN _____

OUT_____

CLASS OF WORK_____

| RATE | LABOR | TOTAL HRS. | COST |
|---|---|---|---|
| | | | |

| | | | |
|---|---|---|---|
| | TOTAL LABOR | | |
| | TOTAL MATERIAL | | |
| | GRAND TOTAL | | |

REPAIRED BY

REPAIRED BY

3

Car No._____ Date_____

Location _____

Speedometer Reading _____

Tire Number _____

4

Car No._____ Date_____

Location _____

Speedometer Reading _____

Tire Number _____

Cause for Change _____

5

Form R-16 500 10-20 Thompson

THE TENNESSEE ELECTRIC POWER COMPANY PUMP NO.--------

GARAGE DAILY GASOLINE AND OIL RECORD

7 A. M.---------- TO 7 A. M.---------- 19----

| | CAR NO. | REGISTER READING—START | REGISTER READING—STOP | No. GALS. | QUARTS OIL | CAR No. | REGISTER READING—START | REGISTER READING—STOP | No. GALS. | QUARTS OIL | CAR No. | REGISTER READING—START | REGISTER READING—STOP | No. GALS. | QUARTS OIL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | | | | 102 | | | | | 27 | | | | |
| | 2 | | | | | 103 | | | | | 28 | | | | |
| | 3 | | | | | 104 | | | | | 29 | | | | |
| | 4 | | | | | 106 | | | | | 30 | | | | |
| | 5 | | | | | 108 | | | | | 33 | | | | |
| | 86 | | | | | 23 | | | | | | | | | |
| | 95 | | | | | 24 | | | | | Shop | | | | |
| | 96 | | | | | 25 | | | | | | | | | |
| | 97 | | | | | 26 | | | | | | | | | |

REGISTER READING STOP_____ REGISTER READING STOP_____

" " START_____ " " START_____

TOTAL GALLONS_____ TOTAL GALLONS_____

SIGNED_____ SIGNED_____

6

Form 6-100 500 3-26 Thompson

PNEUMATIC TIRE RECORD

TIRE No. MAKE SIZE COST

| CAR No | POSITION | IN | SPD. READING | OFF | SPD. READING | NET MILEAGE | TOTAL MILEAGE | COST OF REPAIRS | DEFECT |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

7

No. 1. "In and Out" form for all vehicles; 19 in. across and 11⅝ in. high, printed on white bond paper with blue rules.

No. 2. Monthly costs are tabulated under five headings. The form, which is 13⅞ in. x 11⅝ in., is printed the same on front and back.

No. 3. On each vehicle being inspected or repaired is this 5½ x 8½-in. white card showing labor and material, the latter listed on the back of the form under Quantity, Kind of Material and Cost.

No. 4. This is a yellow tag, 2⅝ x 5¼ in., marked "Tire On" the back.

No. 5. Is a red tag of same size with "Tire Off" printed on the back.

No. 6. Car numbers are repeated so that two entries can be made daily. The form is on 12⅝ x 14½ in. white stock with blue rules.

No. 7. The tire record contains the life history of each tire as well as its location. This is a 5 x 8-in. card.

**Yellow buses and Packard touring cars are some of the equipment that is stored and maintained at Chattanooga. At the rear are tools used in the repair shop**

has a steel frame with brick and hollow tile walls, represents an investment of about $45,000, while the garage equipment installed required an investment of at least $1,000 more. Roof and ventilators are of the Roebling steel type and a Wing blower heating system is installed. The roof is mounted on steel trusses with 15-ft. headroom and set on 20-ft. centers.

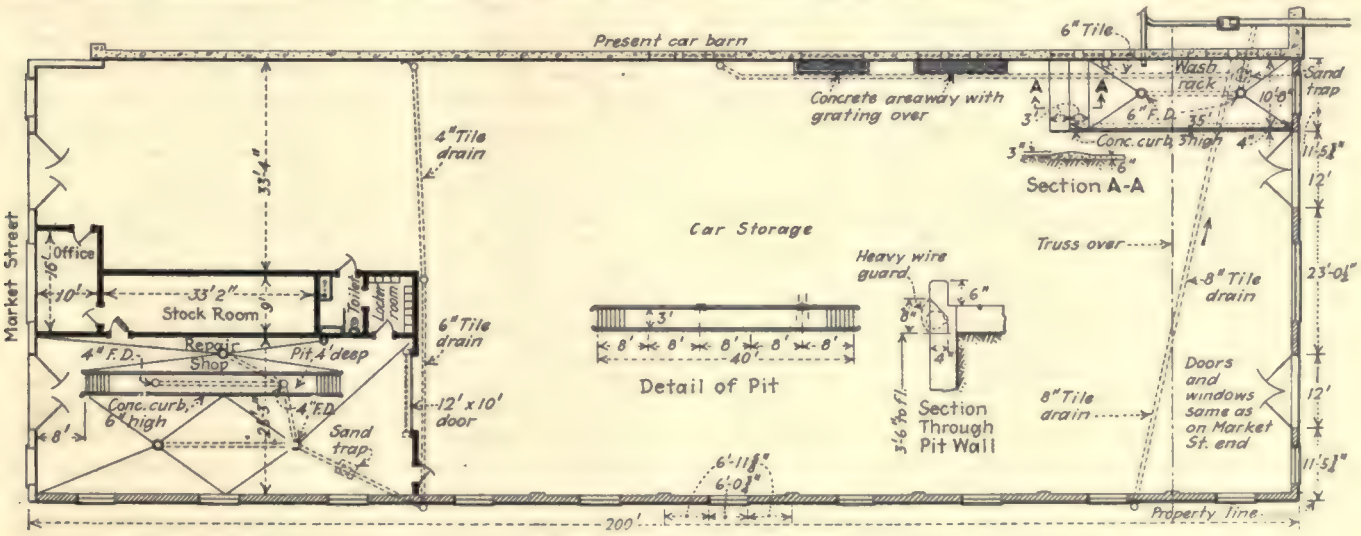
At the Market Street end there are grouped in one corner an office, stock room, locker room and repair shop as indicated in the plan. These are separated from the storage portion of the garage by 8-in. hollow tile walls carried to the roof. Thus of the total 14,000 sq.ft. of area, a little more than 80 per cent is used for storage, about 11 per cent for the repair shop, and 8 per cent for the other rooms. There is a wash rack in the southwest corner which is separated from the garage by a concrete curb 3 in. high and 4 in. wide along the side. It has a raised portion at the end over which vehicles can be driven.

A useful part of the repair shop is a pit 40 ft. long, built along railway lines. It is 4 ft. deep, and along each edge for its full length is a concrete curb 6 in. high and 4 in. wide. Four 50-cp. Mazda lamps are placed in pockets, two on each side of the pit, as illustrated in the plan and one of the views. Over each bulb is placed a heavy wire guard.

Two useful home-made devices are shown in the picture of the pit. The one spanning the pit is to support the jacks used for lifting the rear end of a bus. It is made of 1-in. x 6-in. steel bar. Its shape is such that it gives the men plenty of room to work. The other device consists of two pieces of strap bent to hook over the edge of the pit so as to support a tool chest or a box for spare parts.

Gasoline is bought from the Standard Oil Company. It is stored in two tanks, each of 560 gal., from which it is pumped direct to the buses or automobiles. Galena oil is used for the company's Yellow buses. It is kept in drums fitted with single-stroke pumps. These vehicles also use Dixon No. 677 differential grease and No. 672 gear grease.

Smaller parts kept in the storeroom are held in a




**Two 12-ft. doors are placed at each end of the Chattanooga building, leading to two of the main streets**

Berloy Berger all-steel cabinet. Parts most frequently needed for the various vehicles are stored here, although no effort is made to keep many of the heavier parts. Three all-steel work benches 6 ft. long and 30 in. wide have been placed in the repair shop. They are fitted with vises made by the Reed Manufacturing Company.

Several devices have been installed for the more efficient handling of equipment. These include three Chisholm Moore chain hoists, three Weaver garage jacks, three Reese portable jacks and one Weaver High-Lift jack of 4-ton capacity. For routine repairs there are a Black & Decker valve refacer, electric drills, a Russell relining machine, Alemite pressure grease gun, and a 40-ton Weaver gear press. The Monarch 9-in. engine lathe, the Hisey-Wolf double-wheel electric grinder, an acetylene welding outfit and a Marshall constant-potential battery charging outfit have also been found useful.

Two methods are used for keeping track of the company's miscellaneous collection of buses, trucks and automobiles. First, a daily record is kept of the time a vehicle is taken out of the garage, the time it is returned, the miles covered in the period and the driver's name. The form used is reproduced with this article.

Second, a cost record is kept for each vehicle. Totals are entered on a sheet which is used for making the monthly report to the executive officers. There are five divisions of costs, built up as follows: All labor and material are recorded on the card "Automobile Inspection and Repairs," a copy of which is attached to any vehicle which is in the garage for repair work or inspection. The next items, fuel and oil, are taken monthly from the sheet headed "Garage Daily Gasoline and Oil Records," which is filled out each day as any vehicle is supplied.

The system used for the tire costs also permits keeping track of the location of any given tire. When a new tire or one repaired is placed on a vehicle a yellow card, "Tire On," is filled out with the number of the car, the speedometer reading and the tire number. This number is also entered on another card, "Pneumatic Tire Records," kept for each individual tire in use. When the tire is removed a red card, "Tire Off," is filled out with location, speedometer reading and the cause for the change. The information from the red card in turn is transferred to the proper tire record card. Any expense in repairing a tire is noted on this red card and is totaled at the end of the month from the cost record to give the item "Tire Costs."

This garage is considered large enough to take care of our requirements for some time to come. More equipment may be added as additional experience is gained, but the results so far indicate that our engineers have made a wise selection not only in the building construction and facilities but also in the garage equipment.

# Combination Salt, Sand and Side Wing Car

By Robert Harris
Master Mechanic New Brunswick Power Company, St. John, N. B.

KEEPING snow at a reasonable distance from car tracks so that additional roadway space would be available for vehicles following a snowstorm is a necessity in the northern country. To meet the requirement for additional equipment for the purpose the New Brunswick Power Company, St. John, N. B., built a combination car in its shops. The dimensions of the car are given in an accompanying table.

The underframe construction of the car is of steel and wood. The outside sills are ⅜-in. x 4-in. x 4-in., 8.5-lb. angles, laid with the flanges on the outside and the bottom. A 5-in. x 6-in. wood filler is attached to receive the outside sheathing and double floor. The intermediate sills are 1¾-in. x 5-in., 6.5-lb. channels, placed 3 ft. 5 in. on centers and an equal distance from the outside. Provision is made for trapdoors for the inspection and repair of motors. The use of a shallow channel permits a low center of gravity. The channels are notched into the cross sills, which are spaced to suit motor conditions, and the whole framework is tied together with tie rods spaced 3 ft. 4 in. apart. Angles and crown heads are used under vestibules. The side sills, intermediate sills, drawbar sills are all fastened securely to a 6-in. channel bumper 15.5 lb. to the foot.

The sides of the car are built up of 2½-in. x 3-in. ash posts with double cross bracing. Sheathing is used inside and out with ¾-in. tongued and grooved material. This runs perpendicular outside and longitudinal inside. The roof is of the arch type. Windows are provided in the cabs for double-end operation and a window on each side is used when winging back snow.

Metal boxes installed directly over each wheel are fastened securely to the side of the car. These contain approximately 18 cu.ft. of sand to be used for sanding the rails. The sand also acts as ballast for the car while winging back heavy snowfalls. The flow of sand to the rail is controlled by means of hand levers which operate the two forward boxes in the direction that the car is going. The sand flows through slide valves and down metal lined hose to the rail, the amount being regulated by the distance that the lever travels.

In addition to carrying sand, the car is also loaded with from 40 to 50 bags of salt, each bag weighing 160 lb. Individual bags are placed on a table on each side of the car from which the salt is emptied into hoppers. The salt is distributed to the tracks after passing through rollers and a metal pipe.

DIMENSIONS OF COMBINATION SAND, SALT AND SIDE WING CAR OF NEW BRUNSWICK POWER COMPANY

| | |
|---|---|
| Length over bumpers | 25 ft. |
| Width over drip-boards | 6 ft. 8 in. |
| Height rail to top of trolley board | 11 ft. 2 in. |
| Height (inside) floor to roof boards | 7 ft. |
| Type of truck | Single, 21-E-Brill, reinforced, 7-ft. wheelbase |
| Wheels | Rolled steel, 33 in. diameter, 5-in. axle, solid gear |
| Motors | Westinghouse 101-B-2, 15:69 gear ratio |

A solid steel side wing is installed on each side of the car. This is constructed of ⅞-in. x 24-in. x 14-ft. material and weighs 1,000 lb. The wings are arranged so that they swing out from the body of the car and they may be set to any desired distance from the rail up to approximately 14 ft. The wings are also provided with interchangeable blades on the bottom that can be raised and lowered to clear certain obstructions.

The total weight of the car is approximately 20 tons. In addition to being used during winter weather, it is proving a valuable piece of equipment for all-year service. To add to its utility it is planned to attach an ice breaker.

*Electric Railway Journal Maintenance Data Sheet*

### This Section Represents a

# New Service to Maintenance Readers

### of "Electric Railway Journal"

MANY electric railway men have suggested the advisability of publishing the maintenance note material which has appeared in the JOURNAL for many years in a form which would make it more convenient for handy reference. Complying with this desire, a maintenance data sheet section will become a regular feature of future issues of the JOURNAL and will appear in the third issue of each month.

For convenience in indexing the data for reference, each item will bear a departmental heading such as "Rolling Stock," "Line Department," "Track and Way Department," "Buses and Trucks," "Standards," "General Data," "Power and Electrical Department," etc.

If desired, these general headings may be further classified into specific operations or departments. Thus, items headed "Rolling Stock" may be divided into "Machine Shop," "Truck Repairs," "Motor Repairs," "Electrical Repairs," "Sheet Metal Work," "Tool Room," "Carpenter Shop," "Car Body," "Blacksmith Shop" and "Paint Shop." Other general headings may be subdivided similarly.

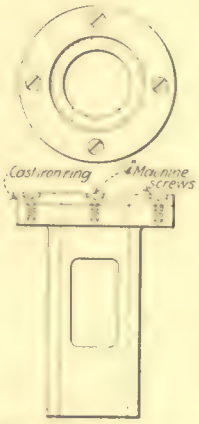
Suggestions are requested from JOURNAL readers as to the character of material that will make this section of greatest value. Maintenance men are urged to take part in the interchange of new ideas. The other fellow wants to know about improved methods of doing a routine maintenance job or a new kink or fixture that saves muscle and labor. By helping him you help yourself. A photograph or sketch with a brief description of the operation or fixture is all that is required. ELECTRIC RAILWAY JOURNAL will pay $5 for each idea published.

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—ELECTRICAL

# Bearing Flanges Reclaimed with Cast-Iron Rings

WORN armature bearing flanges are being reclaimed in the shop of the Washington, Baltimore & Annapolis Electric Railroad at Academy Junction, Md., by the installation of cast-iron rings on the worn surface. Master Mechanic J. A. Mellor believes that at least doubled life of bearings is obtained. The worn flange and the two surfaces of the cast-iron ring are machined and the ring is fastened to the flange by means of four ¼-in. flat-head machine screws countersunk at least 1/16 in. below the outer surface of the ring. When installing these reclaimed bearings a fiber ring is placed between the cast-iron surface and the bearing surface of the oil deflecting ring to keep the metallic wear of these parts at a minimum.



Method of attaching cast-iron ring to worn armature bearing flange used by the W., B. & A.

This practice has been adopted for all types of motors where it is applicable. The rings are being installed when required on all motors as they come through the shop for overhauling.

No trouble has been experienced with these cast-iron rings and it is believed they have effected a large saving in bearing maintenance.

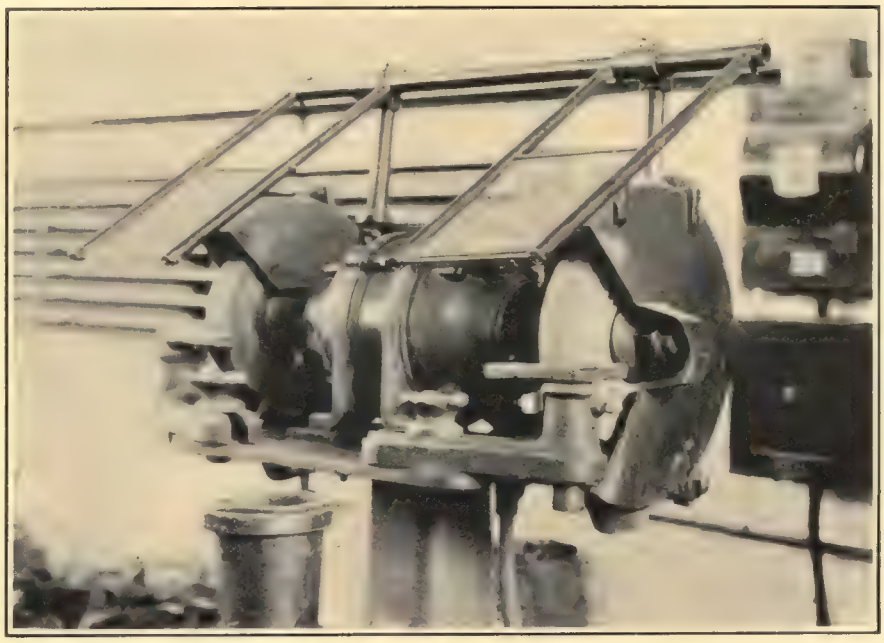
*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—MACHINE SHOP

# Safety Glass on Grinder Replaces Goggles

PLATE glass safety guards are mounted on emery grinders in the South Park shops of the Los Angeles Railway to protect the operator's eyes. These 8½ x 10-in. glass guards, one in front of each wheel of a double grinder, are made of ¼-in. plate glass. The frame is supported by brackets attached to uprights mounted on the grinder. The side members of the glass frame are of ½-in. pipe, the cross-member and the uprights at the back are ¾-in. pipe. The brackets which hold the horizontal member are made with set screws so that the frame may be slid sideways to cover wheels of various widths or those mounted with extended arbors so they do not fall in the same line as the standard wheel.

This type of guard has been approved by the local council of the National Safety Council. It allows operators to use wheels so equipped without wearing goggles.



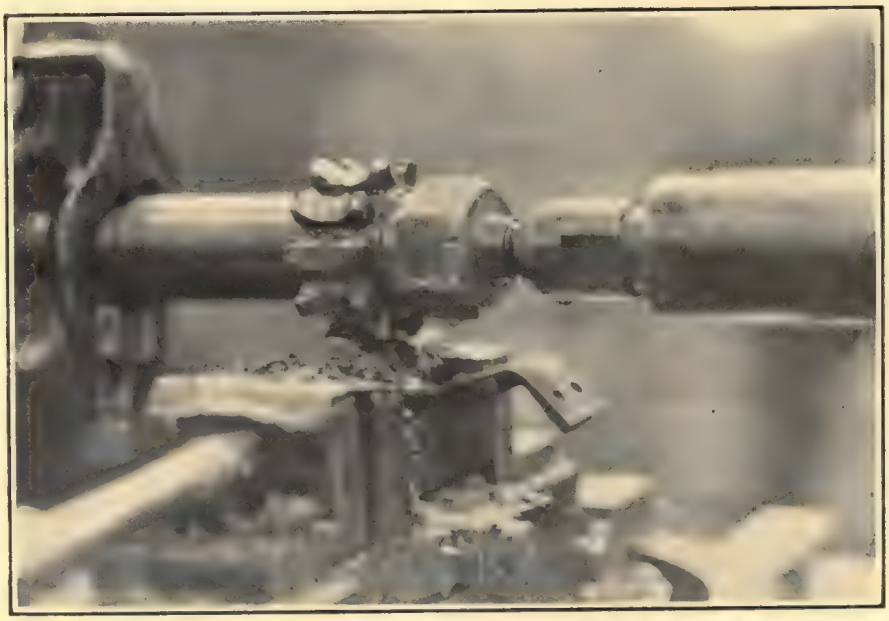
Protecting windows mounted over emery wheels as a substitute for goggles, Los Angeles Railway shop

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—ELECTRICAL

# Contact Fingers Refinished in Lathe

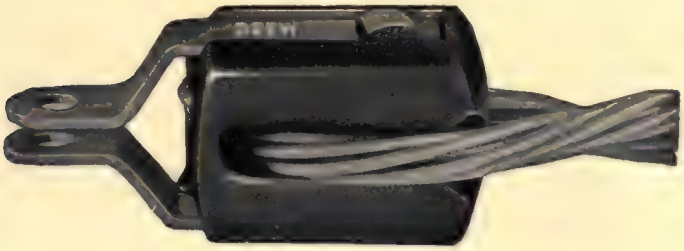
BURNED contact fingers on K-35 controllers used by the Market Street Railway of San Francisco are refinished with a milling cutter in a lathe. The finger is held in a special clamp which allows for adjustment both horizontally and vertically. This clamp is mounted on the cross-feed carriage. The concave-shaped milling cutter is carried on a mandrel. Alignment of the fingers to be refinished is obtained by the use of the longitudinal feed on the lathe and the adjusting screw in the clamping device. The finger is fed against the milling cutter by the automatic cross feed. A very fine cut removes all the imperfections on the finger.



Controller fingers are refinished in lathe operating as a milling machine. The concave cutter takes a fine cut off of the finger

# DREW Equipment for Electric Railways

**Drew Floating Bell Hanger**
Positively eliminates loose ears because of tight lock between hanger and ear. Prevents rusted and worn threads. Assures better service with a saving.



**No. 7520 Porcelain Strain Clevis**
Used in large quantities by leading railway companies for great variety of overhead work. Practical. Convenient. Ample insulation. Strong enough for any overhead work.

**Drew Spring Ear**
Does away with destructive wear on trolley. Eliminates pounding on trolley wheel, base, hangers, trough structure. Insures smoother and quieter car operation.

Drew Overhead Line Material is always of the latest approved type. Built to a standard that has made Drew Products *first* among railway men, you can be sure that every article will give many years of good, hard service. Easy and quick to install. Economical to buy.

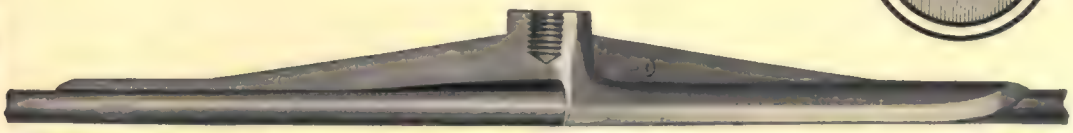
Whatever you need for electrical railway maintenance and installation work, you can know that Drew will deliver what you want, where you want it—when you want it. Drew service is quick, prompt, satisfactory.

Drew Products assure better service with a saving.

*Descriptive material and prices on request.*

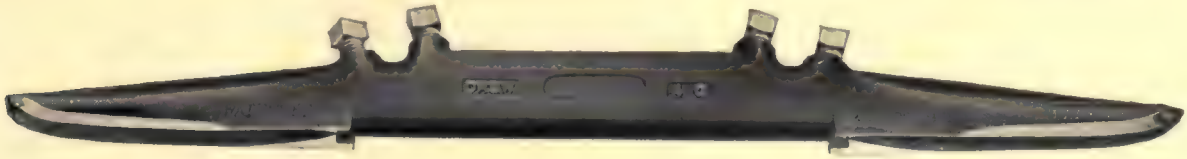
**Drew Safety Mirror**
Greatly reduces boarding and alighting accidents. Quickly adjustable for different types of cars. Gives motorman clear view of steps. Cuts running time because motorman can always be ready for instant starting.

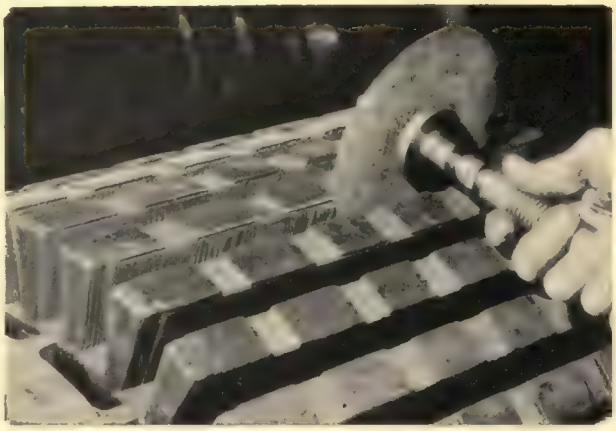
## Drew Electric & Mfg. Co.
Cleveland, Ohio



**Drew Cushion Ear (Above).** The merit of this ear is best recognized from its performance in actual service. Repeat orders over a period of years from large and small properties prove the claims we make for Cushion Ears. Longer life and complete protection for the trolley wire.

**Type "L" Heavyweight or Type "R" (Lightweight) Splicing Ear or Splicer** actually becomes a part of the wire in use, giving smooth under-run for the life of the wire. V shaped approach carries the current collector on and off with minimum jar or vibration. Prevents notching or rough spots.





## "Here's another new one"

# MARTINDALE
## Slot Cleaning Outfit

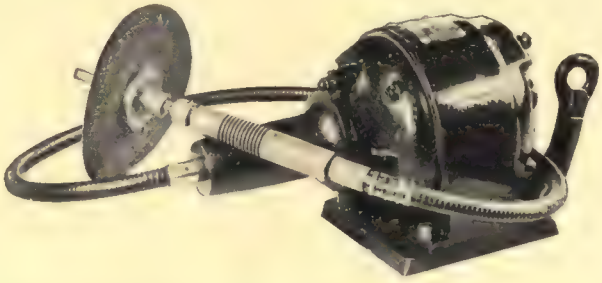
***Uses Flexible, Non-Breakable Disks Which Eliminate All Danger to the Operator***

This is the ideal way to clean old insulation out of armature slots when rewinding armatures.

It saves 75% of the time and labor required to clean up an old armature.

It also quickly removes old solder from the riser slots.

Burrs that will turn a file can be ground off easily.



## Martindale Electric Co.

**1260 West 4th St., Cleveland, O.**

Please send me Bulletin 319-A

*Name* .....

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*Company* .....

*Street and No.* .....

*City* ..... *State* .....

3-19-27

# Strombos Signals for Bus and Railway Service

## *Most powerful of all signals!*

A pleasing sound of tremendous volume is emitted from the powerful Strombos Signal. It penetrates all noises and is audible at great distances. They are admirably suited for electric railway service. Whenever required it broadcasts a warning of approaching danger and promotes safe railway operation.

The *"Strombos"* uses only one-tenth the volume of air required by a whistle. It operates on a pressure of ten pounds or more and is controlled by lever valve and cord. They are furnished with an interchangeable base, for vertical or flat surfaces.

The *"Strombos"* has no moving parts to get out of order or fail in the emergency.

***Write for more complete data and quotations.***

## AMERICAN STROMBOS CO.

**INCORPORATED**

**18th & Market Sts., Philadelphia, Pa.**

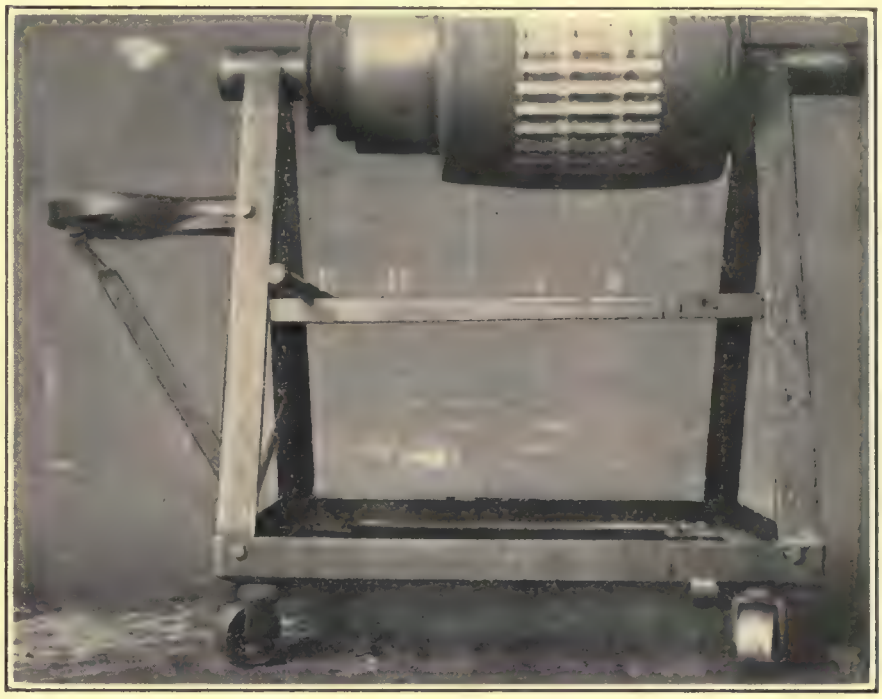
*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—ELECTRICAL

# Portable Armature Winding Truck

PORTABLE armature winding trucks are in use in the armature room of the Wilkes-Barre Railway, Wilkes-Barre, Pa. Each is equipped with a metal shelf and a drop seat. The truck framing is constructed of angles, rigidly bolted together.

The shelf is of sheet steel and is installed between the pedestals the full width of the truck frame. It is very convenient for the reception of the worker's tools and repair material. The wood drop seat is hinged to the pedestal and is found useful when the winder is working upon commutators and connections for commutators. It is claimed that the use of this truck has increased production due to the fact that tools and material are close at hand.



Portable armature winding truck with workman's seat and material shelf

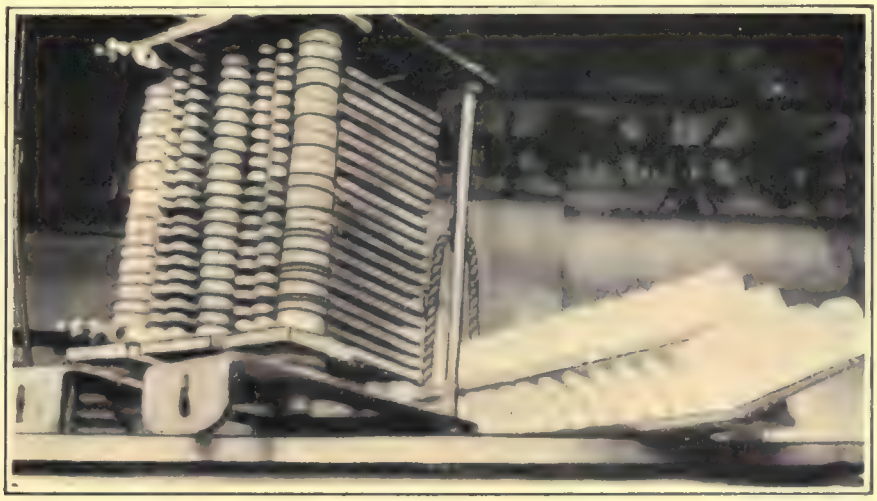
*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—ELECTRICAL

# Fiber Washers Increase Creepage Distance on Resistors

INCREASING the creepage surface on rheostats has been accomplished by the New York Railways through the installation of a 3-in. x 3-in. piece of red fiber on each grid-supporting rod between the last grid and the frame. This has eliminated creepage to the frame due to mud collection.

Breakage of controller air deflector backs has also been eliminated by the substitution of red fiber. This fiber has proved satisfactory under normal operating conditions and is obtained readily.



Red fiber washers increase creepage distance on car resistors

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—ELECTRICAL

# Armature Coil Insulation Removed by Lye

ARMATURE coils having become inoperative due to deteriorated insulation are being reclaimed in the shop of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa. These coils are immersed in a boiling solution of Red Seal lye and at the expiration of 72 hours the insulation can be readily scraped off. The vat is made of 1½-in. planking and lined with galvanized iron. The solution is heated by means of live steam.

After removal from the lye vat by means of hand hooks they are immediately washed with clean cold water to prevent injury to the workmen. After washing each turn of the coil is thoroughly cleaned, taped and the coil reassembled. It is claimed this process has effected a very material reduction in armature maintenance costs.

Armature coil lye vat

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—ELECTRICAL

Motor repair stand

Circular steel pieces bolted to the ends of the motor case, and small rollers on the supporting framework, allow the case to be turned to the most convenient position for work.

# Rotating Frame Facilitates Motor Repairs

WORK on parts of motor cases that are ordinarily hard to get at has been made much easier by means of a rotating frame used in the Grand Avenue shops of the Connecticut Company, New Haven. This apparatus was designed by J. E. Dooley, master mechanic, and built in the shops. The frame consists of two A shapes held in position by two longitudinal members fastened to the ends by gusset plates, as shown in the accompanying illustration. The ends are continuous 3½-in. x 5½-in. angles bent to the desired shape. Longitudinal members are angles of the same size, but are not continuous. They are arranged to overlap and are bolted together. A series of bolt holes permits the length of the stand to be adjusted according to the size of the motor upon which work is being done.

At each of the upper corners of the end frames is a 4-in. cast-iron wheel. Two circular steel pieces are provided, one bolted fast to each end of the motor case. These circular pieces rest on the small wheels and allow the motor case to be rotated as may be desired.

This arrangement has proved to be a great convenience when field coils are being installed. Instead of being obliged to hold the coil against the top of the motor case, while he is fastening it in place, the shopman now simply turns the case through a half revolution and lays the coil in position on the bottom.

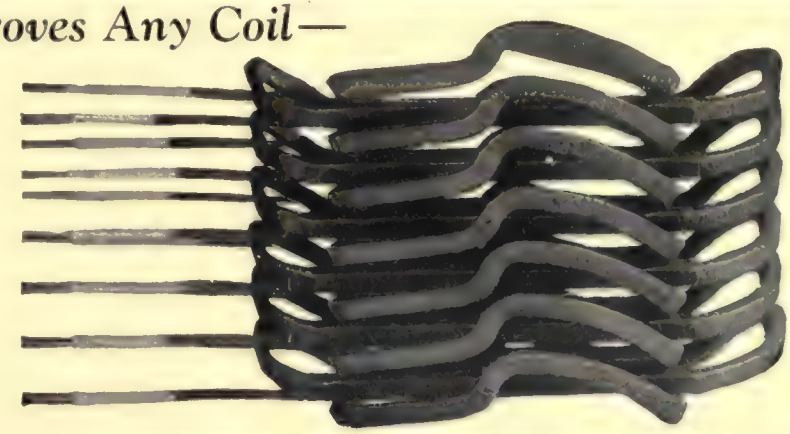
## *Right Installation Improves Any Coil—*

We know there is no coil superior to Elliott-Thompson. Over thirty years have been devoted to its development.

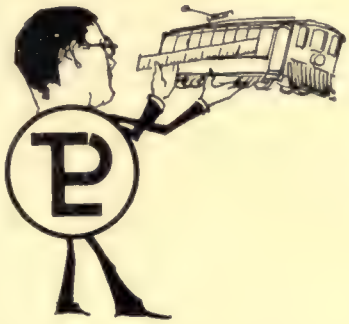
We also know that proper installation will aid even this coil to function more effectively and will prolong its life.

Our experience enables us to advise the best method of installation. We will be glad to give you the benefit of our knowledge if you write us.

**Elliott-Thompson Electric Co.**
**Ajax Bldg., Cleveland, Ohio**



## Is All of Your Electric Railway Equipment Made To Specifications?



The only way to be absolutely sure that all the material and construction going into railway equipment is up to the standard, is to have it progressively inspected by P.T.L. inspection experts.

These men are thoroughly familiar with shop practice and manufacturing methods and their service is absolutely dependable.

**Bulletin 28 tells you all about this valuable service. Send for it.**

**PITTSBURGH TESTING LABORATORY**
PITTSBURGH, PENNA.
***Branch Offices in Principal Cities***

# TRENTON TOWER OUTFITS

## *As necessary as the fire towers in a large city—*

Without fire towers a city would fall far short in fire fighting efficiency. It needs towers as independent, fast units. So with Trenton trouble towers.

A call is answered as to a fire. The truck and tower speed as a unit to the job. A lever at the driver's seat elevates the tower to the required height. A solid *railed* platform furnishes a rock-firm working foundation.

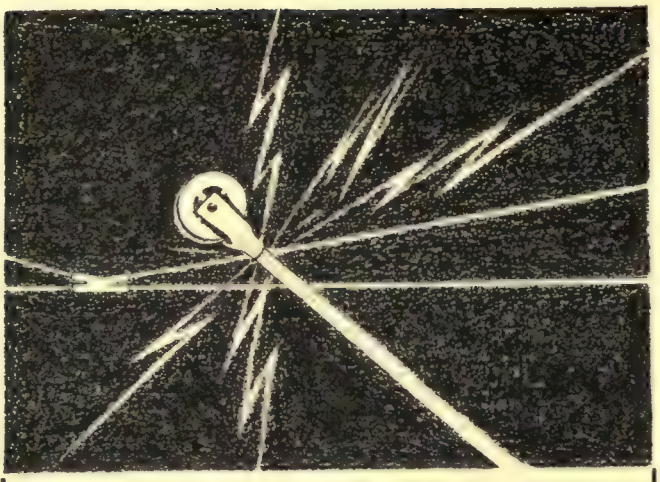
No ladders, no supports necessary. Prominent railways and utilities everywhere use Trenton Towers as standard equipment, and recognize them as the fastest, safest and most dependable means of getting at trolley wires, feeders and pole tops.

**Height—collapsed—11½ feet overall.**
**Height—fully extended—22 feet.**
**Will fit any standard truck chassis.**

*Get full particulars.*

## J. R. McCARDELL CO.

**P.O. Box 242**
**Trenton, New Jersey, U. S. A.**



# "EARLL"

## Trolley Catchers and Retrievers *prevent fireworks!*

A jumping trolley pole, propelled by a strong spring, can do a lot of damage if the car is travelling at a fair speed. How do you prevent this damage?

Earll Retrievers and Trolley Catchers are in motion at the first jump of the pole. They have the pole below the danger line in a jiffy—every time.

They are economical in first cost and installation, their maintenance consists of a squirt of oil three or four times a year; their appearance is dignified and simple; and the construction is designed for hard service.

Few parts, positive in operation, with a powerful mechanism, insure perfect results. Wet rope has no terrors for an Earll.

Get an Earll estimate on your cars. Find out more about this important device. Bulletin on request.

**C. I. EARLL, YORK, PA.**

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International General Electric Co.,
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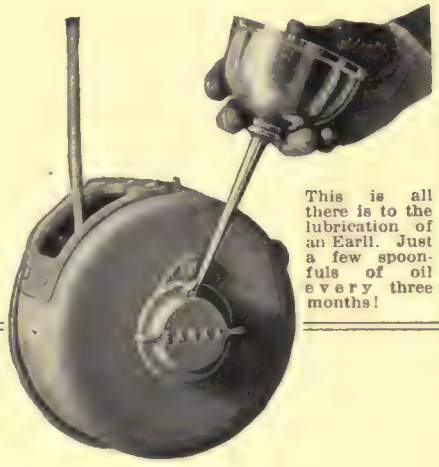


This is all there is to the lubrication of an Earll. Just a few spoonfuls of oil every three months!

# "too big for my wife to wear on a ring"

"This is such a beautiful job it's almost a shame to use it. EUREKA always did do the finest work, and they keep on getting better.

"What I can't understand is how they can turn out work like this at such reasonable prices. And prompt—I can get most anything from them within a week or two."

What work are you expecting to have in the line of:

**Commutators, any size or type—or bars. Brush holders, springs and shunts. Copper leaf and gauze brushes. Controller parts. Trolley and sleet wheels. Bearings and bushings. Line material, including connectors, etc. Switches. Copper and brass washers, copper hammers, etc.?**

**When you want service, write or wire *where service is.* Here we are!**

**Eureka Copper Products Corporation**
**North East, Pa.**

"You'll say: EUREKA!"

**I've found it: Prompt service, high grade electrical parts, and reasonable prices."**

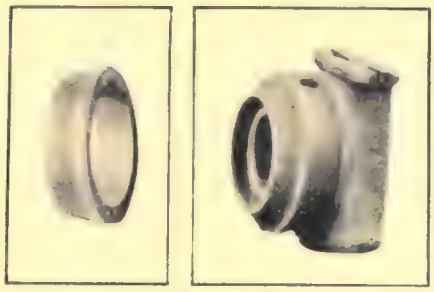
*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—ELECTRICAL

# Motor Heads Reclaimed with Steel Rings

STUDY of several methods for reclaiming Westinghouse 101-B motor heads, as compared with the cost of new ones, convinced J. W. Strawbridge, master mechanic of the Williamsport Passenger Railway, Williamsport, Pa., that reclaiming would be the cheapest proposition.

The method adopted was to shrink a cast-steel ring on the worn head. The steel castings are obtained from the foundry of the Lehigh Valley Transit Company, Allentown, Pa., in the rough. They are of such a bore and outside diameter as will suit every condition of worn head, worn housing or a combination of both. The worn head is turned down to a predetermined diameter and the cast-steel ring is bored to such a diameter as to allow for a tight shrinkage fit over the turned-down head. The casting has a flange and is installed on the head with the flange away from the oil well. After being shrunk on it is turned to the desired diameter. Where the field frame as well as the head is worn the frame is bored out to a standard oversize diameter and the head casting ring turned to the proper diameter to obtain a good fit.



At left, cast-steel ring ready for shrinking on to turned down motor head. At right, motor head ready for service with cast-steel ring shrunk on the machine

This method has resulted in quite a saving being effected in the repair work, and to date not a single ring has come loose in service.

*Electric Railway Journal Maintenance Data Sheet*

TRACK AND WAY DEPARTMENT

# Power Take-off Insures Positive Contact

POWER take-off from the overhead trolley for the operation of portable tools requiring 600-volt energy is made on the Key System Transit Company, Oakland, Cal., by a pole and clamping device, the latter eliminating the possibility of arcing at the wire. The trolley stick, as it is known, is made up in four sections. Three of these are approximately 6 ft. long, while the top one is approximately 18 in. long.

The support for the head in the top section is 1 in. brass tubing, $\frac{1}{16}$ in. thick. Inside of this slides easily another piece of brass tubing. A casting having a boss on one side and a triangular shield of $\frac{1}{8}$-in. copper on the other side is attached to the top of the outer tube. The boss serves as an anchorage for the lever which operates the extreme outer end of the clamping device. The shield, which has a width of 3 in., serves as a guide to the trolley wire when the device is placed in position.

At left, head of power take-off open to receive trolley wire. At right, position when the pole is hooked over the trolley wire

A brass casting on the top of the inner tubing has a groove on the underside and a clamp which presses upward when the head is raised so as to hold the trolley wire in the groove.

The jaws are approximately 3 in. long. A shield of $\frac{1}{8}$-in copper is fastened to the head casting, which, along with the shield on the lower head, guides the trolley wire into the groove. A pair of levers hold the two heads together and actuate the clamp.

When not in use the head drops by its own weight, opening the jaws of the clamp. When the head is hooked over the trolley wire the wire seats itself in the groove and the weight of the pole lifts the head and causes the clamp to close up on the wire. Raising the pole, the weight of the head causes it to drop in the tube, opening the clamping device.

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—ELECTRICAL

# Emergency Magnet Winding Machine

WHERE coils are wound at infrequent intervals, or where a number of small magnet coils have to be wound in a hurry, it may be necessary to provide some sort of shop-made equipment to take care of the work. The accompanying illustrations show how a coil-taping machine was arranged to wind small magnet coils in the department of electrical repairs of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y. In the sketch the tension pegs, numbered 1, 2 and 3, and the tape holder, 4, of the original coil-taping machine were removed from the rotating member, *P*. Three equidistant poles marked *S*, *S*, *S* were drilled and tapped in the rotating part of the machine, as indicated. A disk, *K*, was then made of ⅛-in. sheet steel and holes were drilled in this to correspond with the holes *S*, *S*, *S*. A ¾-in.-hole was also drilled in the center and the disk was then screwed to the rotating member, *P*, of the taping machine. Studded arbors, of sizes necessary to fit the spools of the magnet to be wound, were provided, and these were bolted to the disk through the center hole. A steady rest was provided for the outside end of these arbors. This steady rest, which was screwed to the bench, was provided with a hinge so that it could be rotated down out of the way while a spool was being inserted over the arbor and to provide for removal of the coil after it was wound. The machine was driven in the usual way by means of a belt. The necessary changes for installation of the disk in no way interfered with the usefulness of the machine for its original purpose.

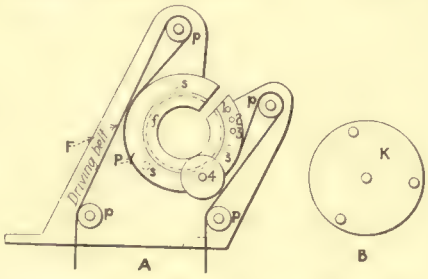



Diagram to illustrate changes in coil-taping machine to adapt it for winding small magnet coils

Winding a coil with the converted machine

*Electric Railway Journal Maintenance Data Sheet*

TRACK AND WAY DEPARTMENT

# Truck for Transporting Oil Lamps

LABOR of collecting and distributing way department oil lamps has been reduced materially by E. L. Greene, master mechanic York Railways, York, Pa., since the adoption of a manually operated truck designed and built in the company's shops.

This truck consists of a box-shaped skeleton frame 12 ft. long, 18 in. wide and 2 ft. high, with an over-all height of 48 in. above the floor. The frame is built of yellow pine timbers, 2 in. by 3 in., braced with ½-in. x 2-in. flat steel, and is mounted on a pair of 18-in. iron wheels.

Suitable hooks are installed on each of the longitudinal beams for the reception of the lamps. These are so spaced that the lamps can be suspended and moved about without damage to one another.

The truck weight being well balanced, one man can move it easily. Previously considerable time and labor were required to transport these lamps by hand.

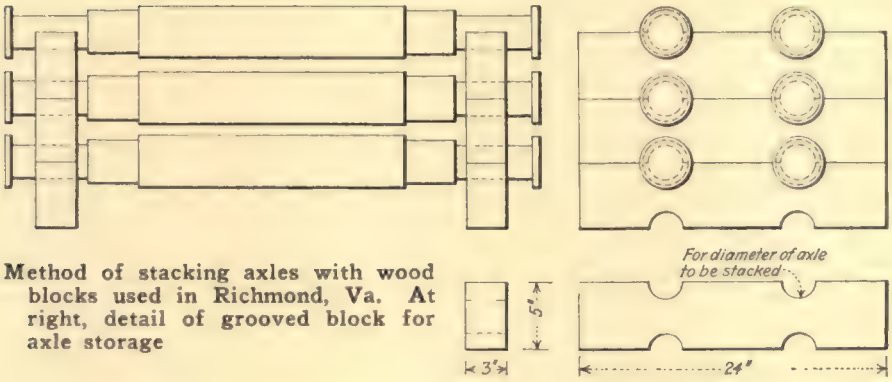
Using the portable truck, the labor has been reduced to such an extent as to permit of one man performing the entire operation.

Portable truck with lamps ready for transportation

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—TRUCKS

# Grooved Wood Blocks for Axle Storage




Method of stacking axles with wood blocks used in Richmond, Va. At right, detail of grooved block for axle storage

DUE to car axles being scattered about the floor the machine shop of the Virginia Electric & Power Company, Richmond, Va., presented a rather untidy appearance until the master mechanic, W. J. Hicks, devised a method for their neat, compact and systematic stacking. This consists of the utilization of oak blocks grooved to conform to the diameter of the axles to be stacked, and placed between each pair of axles at either end. The blocks are 3 in. high, 5 in. wide and 24 in. long.

To permit of easy handling the axles are stacked under lifting facilities. New axles of one size are put in one pile, old axles of the same size to be turned are placed in another, and bent axles of the same size in a third. With this arrangement axles can be removed from the top of the pile and the ones on the bottom will not have to be disturbed, although they can be inspected readily.

This stacking of axles has improved the shop appearance and has provided a means for decreasing the floor space required for the storage of a given number of axles. When not in use these blocks can be stored away in a neat and systematic manner.

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—TRUCKS

# Handy Type of Car Wheel Buggy

SHOPS are sometimes so crowded that it is impossible to roll wheels after they are mounted and unless some type of crane or hoist is available the transporting of wheels is rather difficult. To meet this condition a handy type of buggy has been devised in the shops of the Grand Rapids Railway, Grand Rapids, Mich. This consists of two central 8-in. diameter wheels connected by a shaft. Arms extend out on either side of this shaft a distance necessary to support a pair of mounted car wheels. Each supporting arm is made of two pieces of steel strap, one piece passing above and the other below the shaft. These are shaped to provide an ample bearing surface and the extreme ends are turned up so that a pair of wheels can be rolled into position and held without danger of slipping off. A pair of wheels mounted on the buggy can be balanced easily and so pushed endwise to any location desired. When the wheels are in a balancing position there is a small clearance for the ends of the supporting straps above the floor.

Pair of mounted wheels in position on buggy for transporting about shop

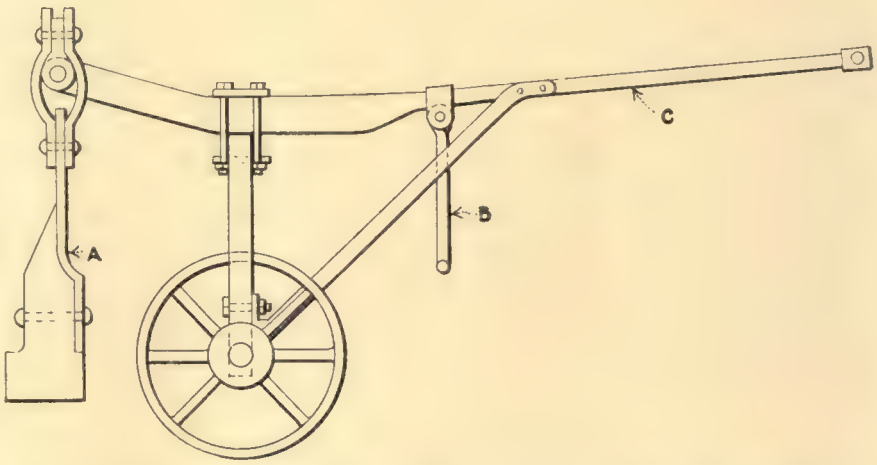
*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—TRUCKS

# Truck for Handling Car Axles

FOR moving car axles about the shop a handy truck is used by the Interborough Rapid Transit Company of New York.

This truck, which was designed and built in the company's shop, is shown in the accompanying sketch. To lift and move an axle the truck is placed so that the wheels straddle it and the handle, *C*, raised to such a height as will permit the tongs, *A*, to grip the axle slightly beyond the center of gravity. Lowering the handle, *C*, raises one end of the axle from the floor until the hook, *B*, can be slipped under the overbalanced end. By raising handle, *C*, the axle is then lifted clear of the floor so that it can be transported to any desired location.



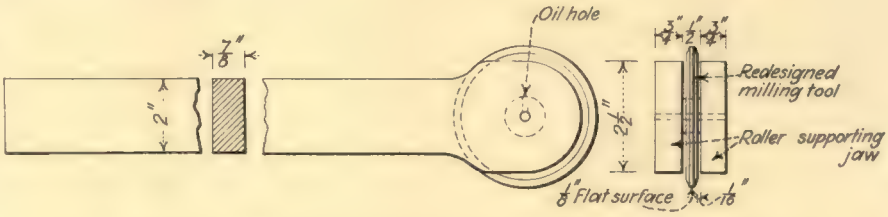

Truck used by Interborough Rapid Transit Company for handling car axles about the shop

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—TRUCKS

# Polishing Bearing Surfaces of Axles

POLISHING bearing surfaces of axles is the purpose of a tool which has been designed and constructed in the shop of the Virginia Electric & Power Company, Norfolk, Va., under the supervision of the master mechanic, T. W. Madison. This tool consists of a redesigned 3-in. milling cutter, together with a suitable supporting arm. Finding that a 3-in. milling cutter with a 1-in. arbor hole had served its usefulness as a milling tool, the remnants of the teeth were turned off and the circumference was given a rounding contour except at the top, which was left flat for about ⅛ in. The 1-in. arbor hole was bushed down to ½ in. to provide for the insertion of a ½-in. steel shaft. This bushing is installed with a 1/16-in. projection beyond the side surfaces of the roller to allow sufficient clearance between the side faces and the inside surfaces of its supporting jaw.




Appearance of assembled roller and arm used for polishing purposes

The supporting jaw and arm are made from a 2-in. x 3-in. steel bar, one end being slotted and drilled for the roller and shaft. The bar is tapered down to 2 in. x ⅞ in. about ½ in. from the slotted end, to fit in the tool rest. A ⅛-in. diagonal hole is drilled through the roller bushing for lubrication.

The axle to be polished is run in a lathe at about the same speed as for a finishing cut. The polishing tool installed in the tool rest with the roller forced against the oiled shaft surface produces a high-luster finish.

The results obtained with this polishing tool have been so satisfactory that the usual method of polishing by means of fine files or emery paper has been discarded.

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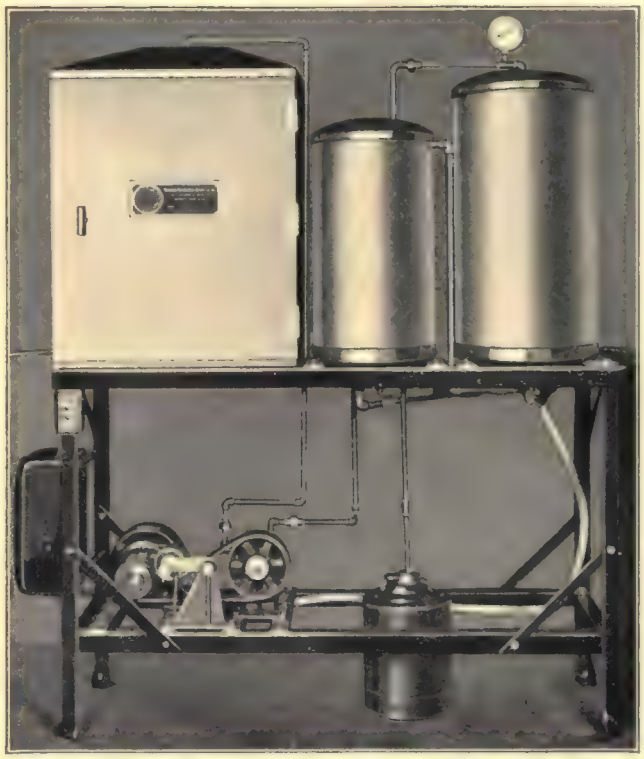

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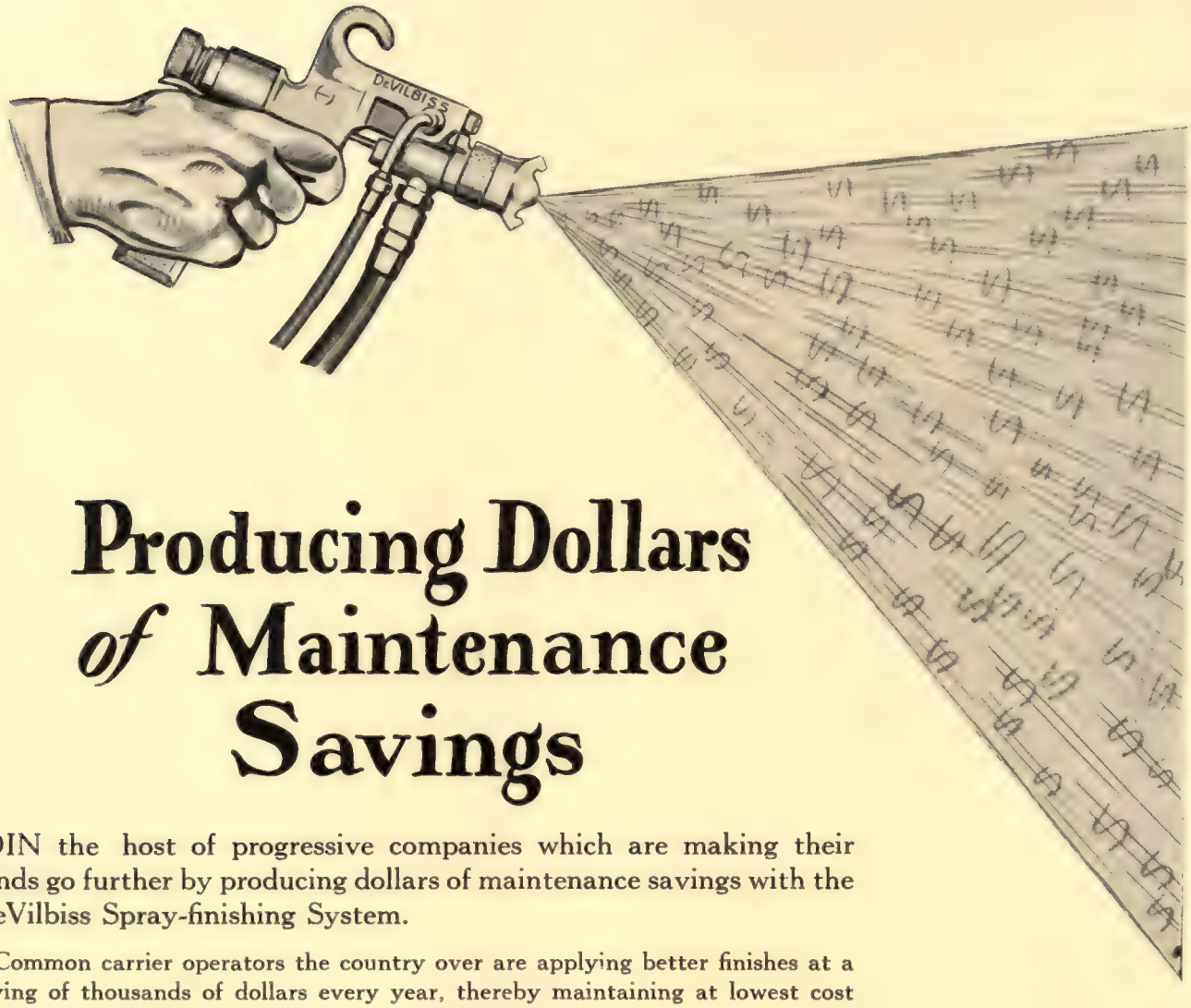


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JOIN the host of progressive companies which are making their funds go further by producing dollars of maintenance savings with the DeVilbiss Spray-finishing System.

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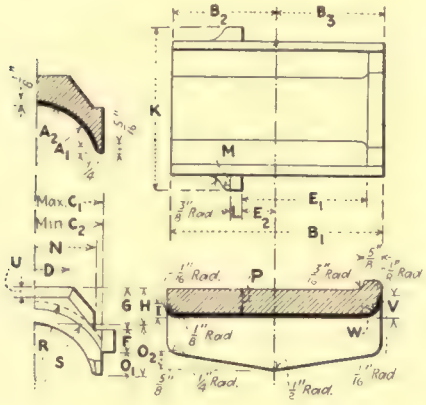
For more than 35 years the name DeVILBISS has stood for practical, honest and dependable products.

*Electric Railway Journal Maintenance Data Sheet*

STANDARDS

# Standard Dimensions of Journal Bearings

THE American Electric Railway Engineering Association has six standard journal bearings which are arranged to fit the six standard axles of the association. These were adopted as revised in 1926. The accompanying drawing and table give these. Originally the standard journal bearings for the six sizes of journals required six drawings. In order to provide uniformity a change on one usually required similar changes on the others, so that six drawings had to be changed each time. As a number of changes appeared desirable to the 1926 equipment committee, it was considered preferable to reduce the number of drawings and provide a table to show the different dimensions. In arranging this it was found that some of the dimensions were not uniform for various sizes. The use of the single drawing and table made these apparent at once, while when used on several drawings they would not be noticed.




Dimension drawing for journal bearings to be used with table

DIMENSIONS OF STANDARD JOURNAL BEARINGS

| Size Journal | A1 | A2 | B1 | B2 | B3 |
|---|---|---|---|---|---|
| 3 x 6 | 1 13/32 | 1 13/32 | 5 1/2 | 2 3/4 | 2 1/4 |
| 3 1/4 x 6 | 1 23/32 | 1 23/32 | 5 1/2 | 2 3/4 | 2 3/4 |
| 3 3/4 x 7 | 1 29/32 | 1 29/32 | 6 1/2 | 3 1/4 | 3 1/4 |
| 4 1/4 x 8 | 2 5/32 | 2 5/32 | 7 1/2 | 3 3/4 | 3 3/4 |
| 5 x 9 | 2 13/32 | 2 13/32 | 8 1/2 | 4 1/4 | 4 1/4 |
| 5 1/2 x 10 | 2 21/32 | 2 21/32 | 9 1/2 | 4 3/4 | 4 3/4 |

| Size Journal | C1 | C2 | D | E1 | E2 |
|---|---|---|---|---|---|
| 3 x 6 | 3 31/32 | 3 31/32 | 1 1/2 | 3 1/2 | 1 1/4 |
| 3 1/4 x 6 | 3 31/32 | 3 31/32 | 1 1/4 | 3 1/2 | 1 1/4 |
| 3 3/4 x 7 | 4 15/32 | 4 1/2 | 2 | 4 | 1 1/4 |
| 4 1/4 x 8 | 4 29/32 | 4 29/32 | 2 5/16 | 4 1/2 | 1 1/4 |
| 5 x 9 | 5 13/32 | 5 1/2 | 3 1/2 | 5 9/16 | 1 7/16 |
| 5 1/2 x 10 | 6 5/32 | 6 1/2 | 3 1/2 | 5 13/16 | 1 7/16 |

| Size Journal | F | G | H | I | K |
|---|---|---|---|---|---|
| 3 x 6 | 1/4 | 1 | 1 | 1/2 | 4 11/16 |
| 3 1/4 x 6 | 1/4 | 1 | 1 | 1/2 | 4 11/16 |
| 3 3/4 x 7 | 3/8 | 1 1/4 | 1 | 9/16 | 5 1/4 |
| 4 1/4 x 8 | 13/32 | 1 9/16 | 1 | 9/16 | 5 3/4 |
| 5 x 9 | 1 7/16 | 1 9/16 | 1 1/2 | 5/8 | 6 7/8 |
| 5 1/2 x 10 | 1 7/16 | 1 9/16 | 1 1/2 | 5/8 | 7 3/8 |

| Size Journal | L | M | N | O1 | O2 |
|---|---|---|---|---|---|
| 3 x 6 | 1/2 | 1/2 | 3 1/2 | 1/2 | 1 1/2 |
| 3 1/4 x 6 | 1/2 | 1/2 | 3 1/2 | 1/2 | 1 1/2 |
| 3 3/4 x 7 | 1/2 | 1/2 | 3 3/4 | 1/2 | 1 1/2 |
| 4 1/4 x 8 | 1/2 | 1/2 | 4 1/4 | 1/2 | 1 3/4 |
| 5 x 9 | 1/2 | 1/2 | 4 1/2 | 1 1/4 | 2 1/4 |
| 5 1/2 x 10 | 1/2 | 1/2 | 5 3/4 | 1 1/4 | 2 3/4 |

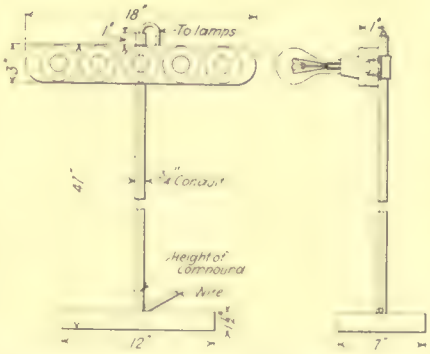
| Size Journal | P | R | S | U | V | W |
|---|---|---|---|---|---|---|
| 3 x 6 | 3/4 | 2 | 2 | 1 | 3/4 | 1/2 |
| 3 1/4 x 6 | 3/4 | 2 | 2 | 1 | 3/4 | 1/2 |
| 3 3/4 x 7 | 3/4 | 2 7/16 | 2 7/16 | 1 | 13/16 | 1/2 |
| 4 1/4 x 8 | 3/4 | 2 13/16 | 2 13/16 | 1 | 13/16 | 1/2 |
| 5 x 9 | 1 | 3 1/4 | 3 1/4 | 1/2 | 1 | 1/2 |
| 5 1/2 x 10 | 1 | 3 3/4 | 3 3/4 | 1/2 | 1 | 1/2 |

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—PAINT SHOP

# Lamp Bank for Use in Paint Shop

EXTERIOR illumination of cars undergoing painting in the paint shop of the Lynchburg Traction & Light Company, Lynchburg, Va., has been improved greatly since several lamp banks were installed in convenient locations adjacent to the cars. These lamp banks were designed by Master Mechanic M. M. Cochran and built in the shop. They consist of a base made of dry oak 1½x7x12 in., in the center of which is installed a piece of ¾-in. conduit 48 in. long. About 1 in. from the end of the conduit is installed a piece of ash 1x3x18 in. long and fastened to the ¾-in. conduit by means of a ¾-in heavy pipe strap. This piece of ash acts as a base for the support of the five incandescent lamps and is grooved in the center to permit of the installation of the wires, which enter the conduit through a ⅝-in. hole drilled directly above the base, make their exit from the end of the conduit and drop down to the groove in the lamp supporting base. Compound poured into the pipe about 3 in. up from the base prevents injury to the insulation of the wires from chafing at their entrance to the conduit. A drilled wood plug inserted in the end of the conduit prevents chafing injury to the wires at the point of their exit from the conduit.

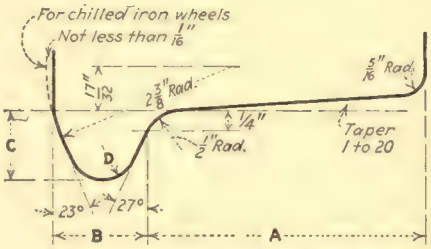



Lamp stands used in the paint shop of the Lynchburg Traction & Light Company, Lynchburg, Va.

*Electric Railway Journal Maintenance Data Sheet*

STANDARDS

# Wheel Tread and Flange Contours

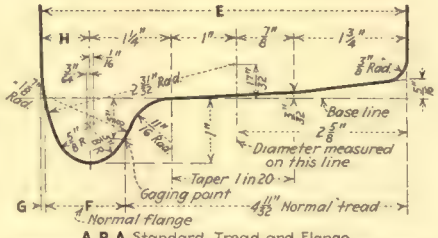



A.E.R.E.A. Standard Tread and Flange Contours for Steel and Chilled Iron Wheels

| Standard Tread and Flange Contours | A | B | C | D |
|---|---|---|---|---|
| A - 3 | 3" | 1 5/16" | 7/8" | 27/64" |
| A - 3½ | 3½" | 1 5/16" | 7/8" | 27/64" |
| B - 2½ | 2½" | 1 1/8" | 3/4" | 15/32" |
| B - 3 | 3" | 1 1/8" | 3/4" | 15/32" |
| C - 2½ | 2½" | 1" | 3/4" | 5/8" |
| C - 3 | 3" | 1" | 3/4" | 5/8" |
| D - 2½ | 2½" | 1" | 5/8" | 29/64" |
| D - 3 | 3" | 1" | 5/8" | 29/64" |

STANDARD tread and flange contours were adopted by the American Electric Railway Engineering Association in 1923. A-3, A-3½, B-2½, B-3, C-2½, C-3, D-2½ and D-3 provide four flange contours each in combination with two widths of treads and are for both steel and chilled iron wheels.

Contour E is for chilled-iron wheels as standardized by the American Railway Association in 1909 and contour F is for steel and steel-tired wheels as standardized by the American Railway Association in 1920. These latter contours were also made A.E.R.E.A. standard in 1923.




A.R.A. Standard Tread and Flange Contours for Steel, Steel Tread and Chilled Iron Wheels

| Standard Tread and Flange Contours | E | F | G | H |
|---|---|---|---|---|
| E | 5 5/8" | 1 15/64" | 3/64" | 3/4" |
| F | 5 1/2" | 1 5/32" | 0 | 5/8" |

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—PAINT SHOP

# Car Painting in Berlin

THE all-metal cars on the Berlin Street Railway system are painted with both the brush and the spray methods. Particulars of these cars were published in the ELECTRIC RAILWAY JOURNAL for Jan. 29 and Feb. 5. The schedule of application with the brush and spray methods appears in the accompanying tables:

SCHEDULE OF OUTSIDE ENAMEL APPLICATION WITH BRUSH, BERLIN CARS

1. Rub all rust spots with No. 00 sandpaper.
2. Wash the surface of the plate with a cleaner to remove any grease or remaining rust spots.
3. Put on foundation oil paint, white.
4. Putty (or cement) all cracks and screw holes.
5. Put on coat of oil paint, white and yellow.
6. Rub down with No. 00 sandpaper.
7. Put on coat of oil paint, white and yellow.
8. Rub down with No. 00 sandpaper.
9. Put on a coat of enamel, white and yellow.
10. Rub down with oiled paper and pumice.
11. Put on a coat of enamel, white and yellow.
12. Rub down with oiled paper and pumice.
13. Striping and lettering.
14. Apply outside varnish.

Total time required is five working days and the material used is as follows:

Material required:

| | | |
|---|---|---|
| Oil paint, white | 6 kg. or | 13.2 lb. |
| Lead putty | 1.5 kg. or | 3.3 lb. |
| Oil paint, yellow | 3.5 kg. or | 7.7 lb. |
| Enamel, white | 3.0 kg. or | 6.6 lb. |
| Enamel, yellow | 3.0 kg. or | 6.6 lb. |
| Enamel, black | 0.5 kg. or | 1.1 lb. |
| Outside varnish | 2.0 kg. or | 4.4 lb. |
| Rubbing enamel | 1.0 kg. or | 2.2 lb. |
| Pure turpentine | 1.0 kg. or | 2.2 lb. |
| Cleaning fluid | 2.0 kg. or | 4.4 lb. |

SCHEDULE OF OUTSIDE ENAMEL APPLICATION WITH SPRAY, BERLIN CARS

A number of cars were painted with the spray method. The first four steps were the same as those just given for the brush method. The later steps were as follows:

5. Rub down with sandpaper.
6. Apply one coat of white oil paint to the upper half by spray.
7. Apply one coat of yellow oil paint to the lower half of spray.
7. Apply one coat of white japan enamel by spray.
9. Apply one coat of yellow enamel by spray.
10. Rub down with oiled paper and pumice.
11. Apply one coat of yellow enamel by spray.
12. Rub down with oiled paper and pumice.
13. Striping and lettering.
14. Apply outside varnish by spray.

Total time required three working days.

The temperature of the room should be 25 deg. C. (or 77 deg. F.) if possible. Artificial drying is not necessary.

The material required is as follows:

| | | |
|---|---|---|
| Foundation oil color, white; (white paint) | 0.75 kg. or | 1.8 lb. |
| Pure turpentine | 0.75 kg. or | 1.8 lb. |
| Lead putty | 1.5 kg. or | 3.3 lb. |
| Oil paint, white | 1.8 kg. or | 4.0 lb. |
| Oil paint, yellow | 4.0 kg. or | 8.8 lb. |
| Japan enamel, white | 1.0 kg. or | 2.2 lb. |
| Enamel, yellow | 3.5 kg. or | 7.7 lb. |
| Enamel, black | 0.5 kg. or | 1.1 lb. |
| Outside varnish | 2.5 kg. or | 5.5 lb. |
| Pure turpentine | 0.5 kg. or | 1.1 lb. |
| Cleaning fluid | 2.0 kg. or | 4.4 lb. |

# Improved Equipment

## for Electric Railway Maintenance

RELIABLE, safe and attractive transportation is a prime requisite of any campaign to attract additional riders. To provide this, much depends upon the equipment available for carrying on the various maintenance operations. More modern machine tools are needed in railway repair shops and improved tools for track and line maintenance work will assist materially in reducing delays and provide for the passengers a smooth, noiseless ride.

Some of the latest improved equipment for railway maintenance is described in the following pages. Careful study of them should produce many suggestions as to equipment needed to bring maintenance to a higher standard and carry on repairs efficiently and economically.

## For Repairing Car Body and Overhauling Trucks

### Wrench Set No. 311

BONNEY FORGE & TOOL WORKS
Allentown, Pa.

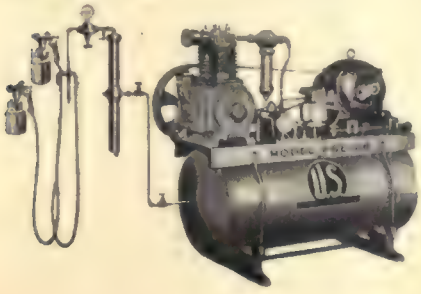
WRENCHES in sets, as shown, are suitable for general repair work. This set, designated as No. 311, consists of three each of the eleven most popular sizes. They are drop forged from vanadium steel, very light and

thin but yet strong and well balanced. Thin, pear-shaped jaws permit maximum clearance in close quarters. Each one is guaranteed to strip the thread or break the bolt without damage to the wrench.

### Paint Spray Equipment

UNITED STATES AIR COMPRESSOR COMPANY
Cleveland, Ohio

MODEL PSE-26 paint-spraying unit, as shown, is of the twin-cylinder, air-cooled, single-stage type and has sufficient capacity for the continuous operation of two paint guns. It will operate within a tank pressure range of 90 to 125 lb. The reducing valve mounted on the moisture separator permits an air adjustment of from 40 to 90 lb. for painting. The displacement of this unit is 16 cu.ft. of air per minute.



The 60-gal. tank has longitudinal seams, riveted and copper brazed. The compressor is belt-driven by a 3-hp. a.c. or d.c. motor, as desired. The complete unit is 36 in. wide, 52 in. long and 48 in. high. It is shipped with moisture separator, reducing valve, air gage, two paint spray guns with quart cups and two 25-ft. lengths of hose and fittings.

### Combination Cutting and Welding Equipment

ALEXANDER MILBURN COMPANY
1416-1428 West Baltimore Street,
Baltimore, Md.

WITH this equipment all operations of welding and cutting can be handled. It is necessary only to change the tips to cut or to weld. The outfit consists of a type N.I. combina-

tion torch, 21 in. long; three welding tips, three cutting tips, an oxygen regulator with 3,000-lb. initial pressure gage and 200-lb. delivery pressure gage, acetylene regulator with 500-lb. initial pressure gage and 50-lb. delivery pressure gage, 25 ft. oxygen hose and 25 ft. acetylene hose, both with couplings; a pair of fiber frame goggles, a pair of workman's gloves, friction torch lighter, combination wrench, instruction book and pressure chart. The approximate shipping weight is 45 lb.

### Lawson Pipe Wrench

LAWSON MANUFACTURING COMPANY
6505 Carnegie Avenue, Cleveland, Ohio

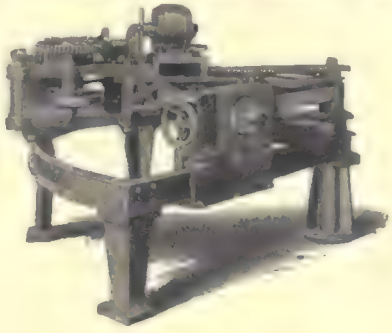
WRENCHES of the type shown are all drop forged from a high grade of steel and have removable jaw housings forged solid with the handle. The jaw teeth are said to be hardened and tempered to give the greatest strength with the least wear. Because it has an angle handle, the Lawson pipe wrench is adaptable to many positions. It has working access to pipes lying close to the floor, wall or ceiling, where it will give ⅓ turn of the pipe. The

wrench has exceptional strength in both handle and jaw. Its compact, self-contained and well-balanced design is mechanically correct. The jaws, which are always in an open position ready to grip a pipe, will release instantly when the wrench is to be removed from the pipe. The location of the adjusting nut and the one coil spring used to hold the jaws open permit of one-hand operation. It is made in sizes of 8, 10, 14, 18 and 24 in.

### Type E Motor-Operated Pipe-Bending Machine

AMERICAN PIPE BENDING MACHINE COMPANY, INC.
37-39 Pearl Street, Boston, Mass.

BENDING of 1¼-in. to 4-in. cold pipe without having it filled with any substance is the purpose of the machine shown. It is capable of making 1¼-in. to 2-in. pipe bends at the rate of ten to fifteen per hour and 2-in. to 4-in. pipe bends at the rate of five to ten per hour. A 3-hp. motor is fur-

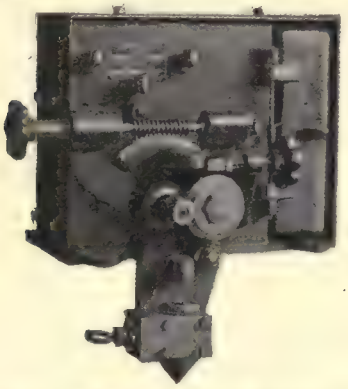


nished with each machine. The complete machine weighs approximately 3,800 lb. and occupies a floor space of 7 ft. 6 in. x 7 ft. 6 in. Suitable bending forms and pipe holders are furnished for the bending of 1¼-in. to 4-in. pipe. Other motor-operated machines in production are the type F standard for bending 3-in. to 6-in. cold pipe and the type F special for bending 3-in. to 5-in. cold pipe. Where hand-operated machines are desirable type F Junior can be furnished for ½-in. bends, type A for ⅜-in. to 1-in. bends, type B special for 1¼-in. to 2-in. bends and the type B Hercules for 3-in. to 4-in. bends. The same construction is incorporated in the hand-operated machines as in the motor-operated machines.

## The Auto Arc

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
East Pittsburgh, Pa.

WESTINGHOUSE auto arcs or automatic arc welding heads are designed for production or repair work on repetition operations, by which production can be greatly increased due to the greater welding speed obtainable. They are adaptable to welding axle housings, gear cases, metal pans or boxes, building up worn car wheels, flanges or brake equalizers and any work where a bead of metal is to be laid in a regular path. The machine automatically feeds the welding electrode to the work at the required speed for the job and will maintain a con-



stant arc voltage. The auto arc will strike the arc automatically. The unit is entirely self-contained, no other mechanism being required except the actual work handling machinery designed either to move the auto arc along the seam to be welded or to pass the work under the arc. The machine consists of a housing approximately 18 in. long, 7 in. wide and 14 in. high, in which is contained a control and driving mechanism. The rolls, guides and nozzle through which the electrode is fed to the arc extend from the front of the case.

The driving and feed mechanism is regularly supplied for use on 110 volts, 25, 50 or 60 cycles alternating current or 230 volts direct current, as desired. Special machines for other voltages may be obtained. The driving and feed circuit is entirely separate from the arc circuit and is not affected by it. It is claimed that the auto arc will stand up under shop conditions and have practically no maintenance except lubrication and an occasional inspection of the moving parts. Adjustments are possible on the nozzle so that the arc can be directed to the part of the work where the weld is desired.

## Petersen "Oiljak"

OIL JACK COMPANY, INC.
15 Park Row, New York City

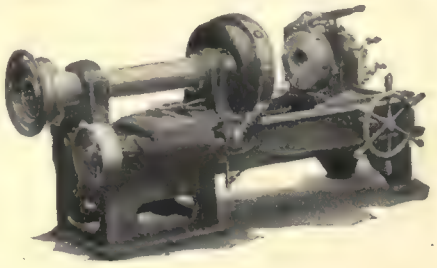
TWO popular models of the "Oiljak," the JB-3 of 3 tons capacity and the JB-10 of 10 tons, are now in full production. Any load within the capacity can be raised with little effort, steadily,

smoothly and quickly. Loads can be lowered without jar or shock and can be stopped instantly at any position. An important feature permits of operation of the jacks with short, inch by inch motions of the handle if desired. A full stroke is not necessary, as is the case of most jacks. This makes the jack advantageous for use in cramped quarters. Where danger exists the jack can be operated from a distance by using a longer handle.

## No. 4 Peerless Improved Pipe Machine

BIGNALL & KEELER MACHINE WORKS
of the N. O. NELSON MANUFACTURING COMPANY
Edwardsville, Ill.

MODERN machine tool design trends toward elimination of cone pulleys and belts. The pipe threading machine shown is designed along these lines. While using a single driving pulley, a constant belt speed is obtained which can be suited to the heavier work. Eight speeds are obtainable with a constant speed motor by shifting the gears. The motor is bolted to the rear of the machine and power is transmitted through a silent chain drive. The machine has a universal gripping chuck which can be set quickly for any size of pipe, thus adapting it for all-round shop use. A Peerless adjusting mechanism permits adjustment to obtain threads at different gages. A cut-off tool and a reamer provide for the cutting off and reaming of all pipe. Accessibility of all gears and ready removal of dies are outstanding features. A direct-connected oil pump is furnished for lubricating purposes.



All parts of the machine are accessible for inspection and repairs. It occupies a floor space of 34 in. x 98 in. Each machine is furnished with one set of right-hand dies for threading 1-in., 1¼-in., 1½-in., 2-in., 2½-in., 3-in., 3½-in. and 4-in. pipes.

## Portable Car Hoists

WHITING CORPORATION,
Harvey, Ill.

PORTABLE car hoists of this manufacturer embody the same basic principles as the Whiting locomotive and truck hoists now widely used. The car hoist consists of a machined steel screw of ample diameter mounted on a worm gear in a substantial base and housed by a structural frame. The projecting step or support by which the car body is lifted rests on a bronzed nut on the steel screw. The car weight is carried on a hardened and ground alloy steel roller bearing. Power is supplied by an electric motor.

By using two pairs of portable hoists, one pair at each end of the car, the entire car body may be raised off the truck at once. The trucks can then be coupled and handled at one time.

All four hoists may be operated as one unit, with the control in one push-button station.

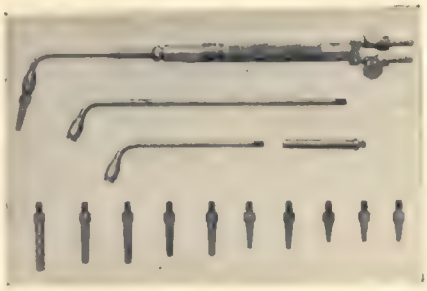
A toggle mechanism lifts the base of the hoist off the ground high enough to put the weight on the wheels, allowing the hoist to be pulled from place to place like a small truck. After being moved into position alongside the car a reverse movement of the toggle lowers the hoist so that its three bearing surfaces rest squarely on the floor. These are spaced to give much greater stability than ordinary jacks. The hoist shown needs no foundation or pit, but may be used on any level floor capable of sustaining the load. No air or water lines are required. Power is used for lowering, so that blocking is not needed under a car, which may be left over the noon hour or night without danger. The hoist will handle cars of any class or size, making unnecessary an assortment of special jacks.

## Airco-Davis-Bournonville Style 7700 Welding Torch

AIR REDUCTION SALES COMPANY
342 Madison Avenue, New York, N. Y.

GAS consumption at the rate of one volume of oxygen to one volume of acetylene, which is the ideal for a perfect neutral flame, is said to be practically attained in the style 7700 torch with oxygen of 99.5 per cent purity. The principles of mixing embodied in the design produce a soft, high temperature neutral flame which favors high quality welding with speed and economy. The new torch is approved by the Underwriters Laboratories and is especially well balanced. The possible combination of extension tubes, mixers and tips provides a torch for a full range of welding from sheet metal to heavy forgings or castings.

The rear end is a brass forging. The



handle is made of seamless knurled brass tubing. The head is of special bronze. Seamless oxygen and acetylene tubes are silver soldered to the head and rear end. Extension tubes 6 in., 9 in., and 16 in. long fit either mixing head. The complete weight of the torch with an 8-10-in. mixer, 9-in. extension tube and with the No. 10 tip is 30 oz.

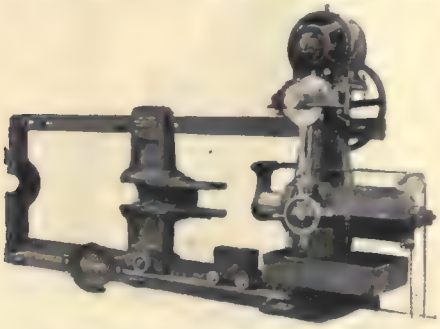
# Wheel and Axle Machining

## Wheel Press

NILES TOOL WORKS COMPANY
Division of Niles-Bement-Pond Company, Hartford, Conn.

CAR wheel presses of 48-in. size have the cylinder member resistance head and end post mounted on a heavy base plate. The cast-steel cylinder is lined with copper expanded into place and burnished. The piston is packed with cup leather.

The hydraulic pressure for working the ram is obtained from a triple plunger pump. Each plunger has a safety valve. All three plungers may be worked simultaneously or any one or any two may be thrown out, giving



a variety of pressures that may be exerted on the piston up to the maximum capacity. The pressure is released by a hand wheel operating a relief valve which permits the water to flow back from the cylinder to the suction tank. A gage indicates the pressure on the ram as well as the total pressure in tons. The resistance head is made of cast steel, supported on rollers running on planed ways on the base. An opening permits the passage of axles. The end post has an opening corresponding to that in the resistance head so that long shafts may be handled. Unless otherwise specified trucks are provided to support the wheels in the press and handle them on and off the axles. These machines can be furnished for either belt or motor drive.

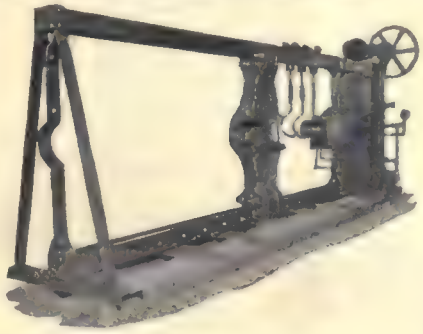
In order to press off wheels from their axles without interfering with the gears a removable attachment with projecting legs can be provided. These legs pass through the holes of the gear wheel and a hinged collar is provided to be placed against the body of the wheel in order to afford a surface against which the wheels can press.

## Hydraulic Wheel Press

LOURIE MANUFACTURING COMPANY
Springfield, Ill.

THIS press was designed especially for heavy pressures. Double bars prevent buckling of the press and shaft if the work is not perfectly centered or if more pressure is needed on one side than the other. The crosshead is a steel casting and a steel gate is furnished for the gap. The resistance pins are tool steel. The ram is returned into the cylinder by means of springs. It is hollow, but has a removable disk fitted into the face. The standard equipment furnished includes all hooks, hangers and fittings, as shown in the illustration, as well as a hydraulic gage, safety valve, operating valve and all other necessary valves and fittings. An automatic differential type of pump used operates the ram rapidly under low pressure and slowly under high pressure.

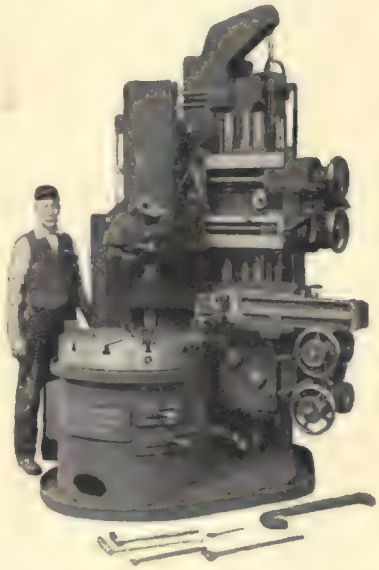
The buttress behind the cylinder is built up of structural I-beams. This permits the use of standard close-grained semi-steel cylinders and pumps. The cylinders are highly polished. Machined cast fillers are placed between the strain bars and the webs of the I-beams. Beams, fillers and strain bars are clamped together by stud bolts.



## Side-Head Boring Mill

NILES TOOL WORKS COMPANY
Division of Niles-Bement-Pond Company, Hartford, Conn.

WITH the side head of this boring tool in working position the machine will take work up to 38 in. diameter. A feature is that the side head may be lowered below the table, so that work up to 44 in. diameter can be finished all over with the vertical head. The bed and column are cast integral. The left-hand housing has a flat bearing and the right-hand housing has a three-track bearing with a long narrow guide for the cross rail and side head. The table and chuck are made in one unit mounted directly on the spindle. The three-jaw chuck which is regularly furnished can be operated either universally or independently. The spindle has a taper bearing for absorbing the vertical thrust. Power is delivered to the table through beveled gears and a disk type clutch. The speed change unit is of the selective sliding gear type, with twelve speeds controlled by two levers. The cross rail is elevated and lowered by means of power. The



turret slide can be swiveled in either direction to an angle of 30 deg., the swivel being graduated on both sides. This adjustment is made by a worm and worm segment which can be operated from either side. Sixteen positive feed changes are provided. Rapid traverse in all directions and a complete equipment of micrometer dials and observation scales are at the operator's command.

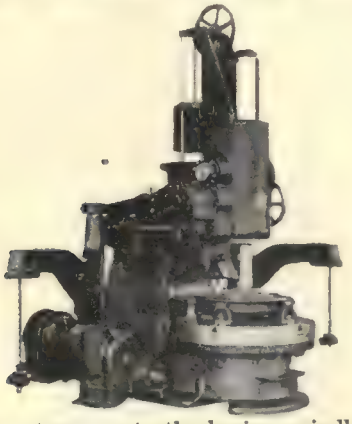
The turret rotates around a cylindrical stud and has bearings equal to the full diameter of the turret. The turret has ten indexing positions so that it can be indexed half way between each of the regular positions. With the turret indexed half way, two tool holders are brought within the field of operation. The side head is mounted directly on the column and there are but two movable joints between the cutting tool and the column. The head extends across the column with a bearing at the center so that all strains are taken on the full width of the column. Rapid power traverse is provided in horizontal and vertical directions for the side head as

well as the vertical head. Each head has sixteen feeds. Flood lubrication is provided for the spindle bearings, speed change gear unit, the feed gear units and the cross rail elevating mechanism. The machine can be furnished for belt drive through a single pulley or with a motor drive. The floor space required is 81 in. x 93 in. It is made in 36 in. and 44 in. sizes.

## 48-In. Wheel Boring Machine

MANNING, MAXWELL & MOORE, INC.
Putnam Machine Works, Fitchburg, Mass.

RAPID power traverse in either direction to both the boring and the facing spindles is regularly furnished with this 48-in. wheel-boring machine in addition to the usual power feeds. One lever controls the feed and traverse movements in each case. The chuck can handle wheels from 6½ in. to 42 in. diameter on the tread. The table is driven by a high carbon cast steel bevel gear and a forged nickel steel pinion. The boring spindle is of large diameter and travels in a long bearing. It has ample travel to allow of running the boring bar above the throat of the machine. The boring spindle is equipped with four feeds controlled from the operator's working position.



Power traverse to the boring spindle is provided in both directions and is controlled from one lever.

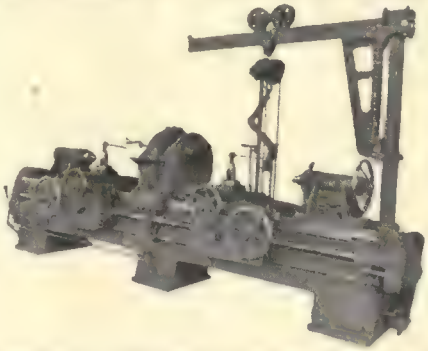
The chuck table has five chuck jaws of hardened steel, conforming in shape to the flange and throat of the wheel tread contour. They are operated universally by a slight motion of one of the three cam studs that are provided so that one will always be convenient to the operator when the table is stopped. If desired, a pneumatic chuck, a hub facing attachment and a pneumatic or mechanical crane can be furnished. The hub facing ram is fitted with a sliding head at its outer end for vertical adjustment of tools. Hubs may be faced while the wheel is being bored.

The drive is through a unit and self-contained gear box giving four speeds in geometrical progression through sliding gears running in oil. If the machine is belt-driven the power is transmitted to the gear box through a constant speed pulley. With electric drive a constant speed motor is geared directly to the gear box. The gear box may be omitted and a three to one variable speed motor geared directly to the table pinion shaft. The machine is started and stopped by starting and stopping the motor.

## Double Axle Lathe

MANNING, MAXWELL & MOORE, INC.
Putnam Machine Works, Fitchburg, Mass.

RIGIDITY is said to characterize this axle lathe. The bed is of a deep, box section and the side walls are connected at short intervals by broad box ties. Longitudinal trusses having cast racks, against which the tailstocks are braced, are located between the shears. The legs are cast integral with the bed, one of them being utilized as a tank for the cutting



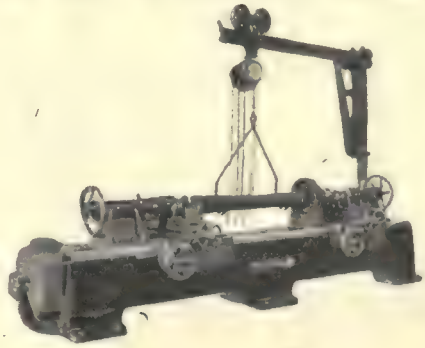
lubricant. The hollow spindle is driven by a herringbone gear and pinion running in a bath of oil, thus affording positive lubrication. The spindle revolves in bronze bearings, one on each side of the main gear. The drive is by means of a double tailed dog which bears against the cast lugs on the equalizing plate. Both tailstocks are adjustable along the bed. Pawls attached to the body engage cast racks in the bed to prevent slipping under a heavy cut. The carriages are guided by V's on the front and rear of the bed and are gibbed on horizontal and vertical surfaces directly in line with the tool thrusts. The feed aprons are of a double wall construction, furnishing a support for all shafts at each end.

An inclosed feed gear box gives three positive feeds which are changed from the center of the bed. The gears are of hardened steel and run in oil. If desired, a crane can be furnished for lifting the axles in and out of the lathe.

## Axle Burnishing Lathe

MANNING, MAXWELL & MOORE, INC.
Putnam Machine Works, Fitchburg, Mass.

JOURNAL burnishing is the principal function of this machine, which in general consists of two tailstocks and two carriages mounted on a base, each carriage having a front and a rear burnishing tool. Both journals of an axle are burnished at the same time. The bed is of box section. The side

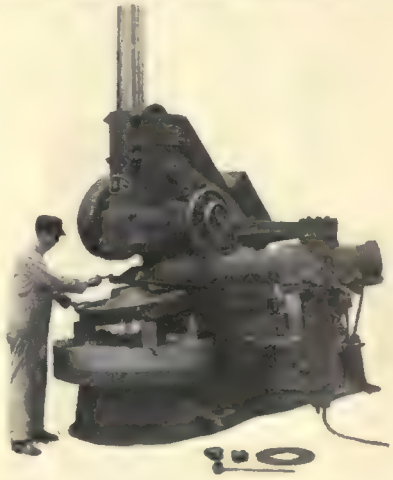


walls are connected at short intervals by box ties. The legs are cast integral with the bed. Both tailstocks are adjustable along the bed. Permanent alignment is maintained by means of taper gibs. The two burnishing rolls are brought into contact with the axle by means of a large diameter screw, operating in bronze nuts. The screw is not confined in the carriage endwise, but is free to float, thus the burnishing tools are forced against the axle with equal pressure and no end thrust is taken by the screw or carriage. By setting the burnishing rolls at a slight angle they feed automatically and therefore a feeding mechanism is not required. The aprons contain only the pair of gears and rack pinion for the hand movement of the carriages. A suitable crane can be furnished with this machine. The floor space required with a motor drive and without the crane is 14 ft. 6 in. x 4 ft. 8 in.

## 48-In. Wheel Borer

NILES TOOL WORKS COMPANY
Division of Niles-Bement-Pond Company, Hartford, Conn.

IN this line of heavy boring machines a self-contained single casting frame makes for rigidity. There are no joints to allow the boring bar to be thrown out of alignment with relation to the table. As soon as the machine is started the wheel is locked rigidly in the self-centering automatic chuck. Stopping and reversing the operation of the table will automatically loosen the wheel from the chuck. All



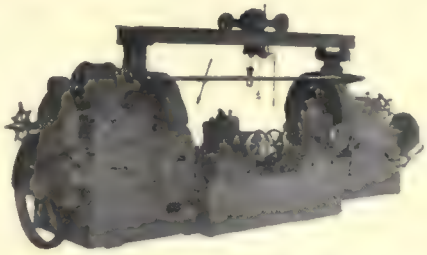
operating levers and handwheels are within easy reach of the operator. Four feeds are available. Changing from a roughing to a finishing feed is accomplished by means of a single lever. There are tapered bushings for both the boring bar and the table spindle. Either a pneumatic or drum type quick-acting crane can be furnished, as desired. The table revolves in a bath of oil on an annular bearing. The bevel driving gear is of semi-steel and the bevel pinion of forged steel. When so ordered, the machine will be equipped with a hub facing attachment. The hub facing bar feeds from the center outlet, so that it can be used at the same time as the boring bar is feeding downward. These machines can be driven by a constant speed motor, an adjustable speed motor, or a belt, as desired.

## 48-In. Wheel Lathe

MANNING, MAXWELL & MOORE, INC.,
Putnam Machine Works, Fitchburg, Mass.

WHEELS from 24 in. to 44 in. in diameter on the tread can be turned on this lathe. The bed is heavy, deep and of ample width for the swing of the lathe and it is braced with cross and longitudinal ribs. All bearings are bronze bushed. The spindle and faceplate are made as one piece. Twelve radial T-slots are provided so that either three or four driving dogs may be used. The end thrust is taken by thrust washers running in a bath of oil. The faceplates are driven by forged steel pinions mounted on a high carbon steel shaft which is carried in bronze lined capped bearings. Each faceplate is equipped with four adjustable, equalizing driving dogs. The tailstock has a power traverse by individual motor and a friction clutch allows the motor to be started under no load. The tool rests are designed with an adjustment to take care of the minimum and maximum diameter of wheels.

The feeding mechanism gives several impulses per revolution and is prac-



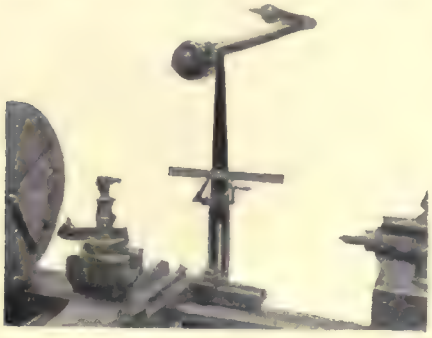
tically continuous. The feed ratchets operate in either direction and are of the inclosed type, excluding chips and eliminating accidents to the operator. A simple calipering attachment furnished with each machine enables the operator readily to size both wheels to the same diameter. When desired a pneumatic hoist can be furnished for raising and lowering the wheels. Either inside or outside journal turning attachments, or both, can be supplied. The machine can also be equipped with a wheel boring attachment. If facing the rims and hubs of the wheels is part of the shop procedure, a cross feed can be furnished. These machines can be supplied with a constant speed motor drive, a variable speed motor drive or a belt drive.

# Equipment for Electrical Repairs

## Mica Undercutter

HULLHORST MICRO TOOL COMPANY
Toledo, Ohio

MOUNTING on any make of lathe carriage through the medium of an angle plate is possible with the No. 9 commutator mica undercutting machine. The main standard is held to the angle plate with two cap screws, which provides for vertical adjustment



to take care of commutators up to diameters of 22 in. Regulation of the depth of the undercutting is obtained with the depth gage mechanism mounted on the vertical standard. The lower arm of the undercutter slides on the depth gage bar.

The cutter spindle and the tapering arbor are made of crucible steel lapped into bronze bearings. Sufficient rigidity is assured by building the spindle in the lower arm with a tapering arbor of $\frac{3}{16}$ in. diameter at the cutter.

Mill-cut precision cutters can be supplied for any depth of slot. The motor is installed at the top of one swinging arm and the power is transmitted to the spindle through a belt turning through a triple mechanism at the center pivot. It is stated that this machine will undercut mica $\frac{1}{32}$ in. deep at the rate of more than 200 ft. per hour. The undercutter is furnished with either a 60-cycle, 110-volt a.c. motor or a 110-volt d.c. motor. The swinging arm can be placed out of the way in the upward position when not in use.

## Field Tester

CENTURY ELECTRICAL COMPANY
100-102 Randall Avenue, Syracuse, N. Y.

FIELD and armature coils of direct-current motors and generators may be tested conveniently with the New Century field tester. Fields may be checked either in place or out of the machine. By testing them in place there is no danger of removing the wrong coil unnecessarily, while the checking of new or repaired coils previous to installation prevents faults leading to the burning out of an armature or the remaining field coils. A scale shows the exact condition of the coil under test, making it possible to detect partial short or open circuits. In testing armature coils, the Century tester

will locate open or short circuits, wrong or crossed connections and grounds without unsoldering any lead wires from the commutator or removing the hoods.

## Martindale Slot Cleaning Outfit

MARTINDALE ELECTRIC COMPANY
Box 2660, Lakewood Branch,
Cleveland, Ohio

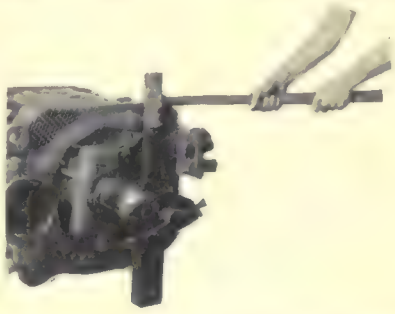
CLEANING the armature core slots by means of grinding disks is the ideal method of removing old insulation prior to the rewinding of the arma-

ture. It saves 75 per cent of the time and labor required for the usual cleaning process. The machine shown will perform this work and in addition will remove quickly old solder from the riser slots. With the addition of a fiber stiffener between the disks, burrs that will turn a file can be ground off easily. A complete outfit consists of a motor, flexible shaft, ball bearing handpiece disk holder, 36 assorted grinding disks, three fiber stiffeners and a box of shaft grease.

## Pinion Puller

GENERAL ELECTRIC COMPANY
Schenectady, N. Y.

SPLIT rings are used with this pinion puller, each half being provided with lugs through which hinge pins are placed to hold the two firmly together.



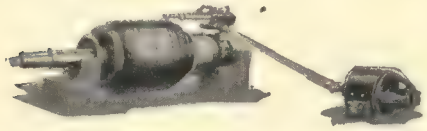
The wedging principle is used, but the wedge, instead of being where it can damage bearings and housings, is placed where it can do no harm. The puller ring grips all the pinion teeth equally, eliminating the possibility of damaging a number of teeth.

The component parts of the pinion puller are the puller ring, the pressure cap if required, the jack-screw, the wedge box, the wedge and the hinge pins. The wedge, wedge box and jack-screw are the same for all pullers, but the puller rings and pressure caps vary with the pinion for which the puller is required. A common ring may be used in some cases for pinions varying only slightly in diameter.

## Commutator Grooving Machine

GENERAL ELECTRIC COMPANY
Schenectady, N. Y.

COMMUTATOR grooving machines of two types have been developed by this company, one portable and the other stationary. In form 2, the stationary machine, the base has ad-

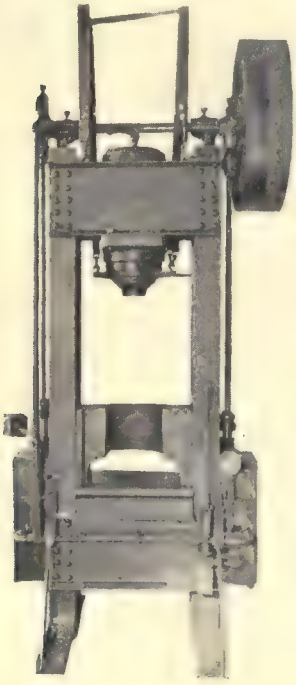


justable pillow blocks with V-shaped bearing surfaces and brass rollers. The slide arm is designed for both vertical and angular adjustment, the latter to be used where the commutator bars are not exactly parallel to the shaft. The rotating saw is mounted on an extension of the motor shaft supported by an offset bearing. This readily permits the grooving of commutators having ears. Owing to the small size of driving motors used no starting resistance is necessary. The form 3 portable machine is simple and can be moved readily to any part of the shop. It is designed to be clamped to the armature shaft. This machine has adjustable stops which direct the travel of the saw to the brush surface of the commutator. A floating driving shaft permits the grooving of a number of slots at one setting of the armature. An angular adjustment can be used when the commutator bars are not exactly parallel to the shaft.

## Inverted Forcing Press

LOURIE MANUFACTURING COMPANY
Springfield, Ill.

STRUCTURAL steel I-beams and channels hot riveted are used in this inverted forcing press. It is a complete self-contained unit. The pumps, most of the valves and the piping are inclosed

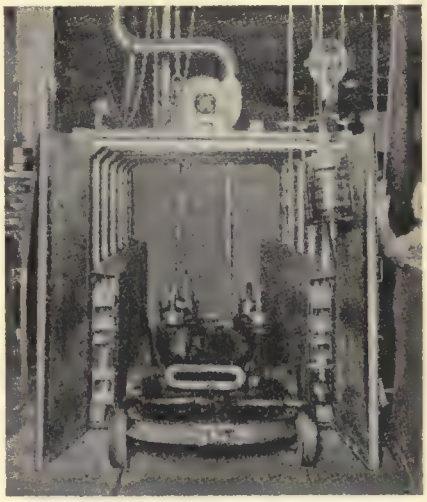


in the oil reservoirs on the side. This eliminates leakage around the press. Leakage oil from the ram is carried to the reservoir by a telescoping pipe. The ram is returned into the cylinder by means of springs. The two pumps used on this press are of the differential type and work automatically. Two large pistons operate the ram rapidly under low pressure. When about one-seventh of the total pressure capacity of the press is reached the large pistons cease to function and the small pistons produce the heavy pressure. The press as shown is suitable for forcing, straightening, bushing work, etc. A hydraulic gage and a safety valve are furnished as a part of the equipment.

## Electric Ovens for Baking Armatures

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
East Pittsburgh, Pa.

TYPE M electric oven is of the kiln type, consisting of an insulated room into which the work to be baked is wheeled on trucks or supported on angle brackets on the oven walls. The



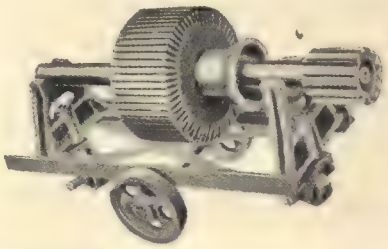
inside and outside walls are sheet metal and the 2-in. space between them is filled with high-grade insulation. The angle framework is bolted together and tie rods hold the sections firmly in place, making the oven capable of withstanding the heavy service of railway work. Sides, top and bottom are all of similar construction, giving the oven a nigh thermal efficiency. The heaters are placed on the side walls and, if conditions allow, along the middle of the oven floor, since this method gives better heat distribution. A wire screen protects the heaters from injury through contact when loading or unloading the oven. Ventilation is by a fan blower system, which increases the drying rate and prevents explosions. The control may be mounted on the side of the oven or separately, depending on which will be more convenient.

The temperature of the oven is held at the proper point by a sensitive thermostat. It is possible to maintain a temperature within 5 deg. F. of the desired point by this means. This control instrument actuates a magnetic contactor control panel which opens and closes the circuit supplying power to the oven and the temperature rises or falls. It is made in three sizes, M-107, M-109 and M-114. The M-107 size will handle six armatures per bake, the M-109 will handle eight armatures and the M-114 twelve armatures.

## Armature Buggy Occupies Little Space

COLUMBIA MACHINE WORKS & MALLEABLE IRON COMPANY
3303 Atlantic Avenue, Brooklyn, N. Y.

VERY small space is occupied by this adjustable buggy. Due to its adjustable features it is suitable for the reception of any size of motor armature. This adjustment is made by



loosening two thumb screws located on the left-hand side of the frame and shifting the pedestals to the desired centers. A buggy of this type used for the transportation of armatures will reduce the possibility of injuring the commutators, shafts, etc. It is made of iron and strongly constructed throughout.

## Adjustable Armature Stands Facilitate Repairs

COLUMBIA MACHINE WORKS & MALLEABLE IRON COMPANY
3303 Atlantic Avenue, Brooklyn, N. Y.

THESE armature stands are substantially made with a broad circular base, a low center of gravity and a screw to obtain a 10-in. height adjustment. The screw threads are made square in order to facilitate handling. Roller bearings in the cradles provide a means for the easy revolving of an armature as well as eliminating

mechanical injuries to the armature shaft. Two pockets cast on the side of the stand provide receptacles for the brackets to support the workman's tool and material tables. These stands can be adapted to many repair jobs about the shop.

## Electrically Heated Babbitt Melting Pot

GENERAL ELECTRIC COMPANY
Schenectady, N. Y.

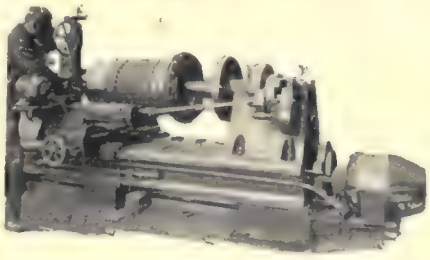
NEARLY all armature, axle and journal bearings for electric car equipment are rebabbitted. For this a conveniently arranged system for melting the babbitt is essential. To meet the requirement the General Electric Company has developed several different sizes of electric melting pots. The one shown in the illustration has a capacity of 5 tons. It is equipped with six cast-in heating units, each of 5 kw.

capacity. This will melt 1,000 lb. of babbitt per hour. Temperatures of from 700 to 775 deg. F. are maintained by thermostatic regulation.

## Banding, Slotting and Turning Machine

LEA COURTENAY COMPANY
Newark, N. J.

ON THIS machine an armature can be turned, slotted and banded without removing it. The machine is especially designed to handle heavy



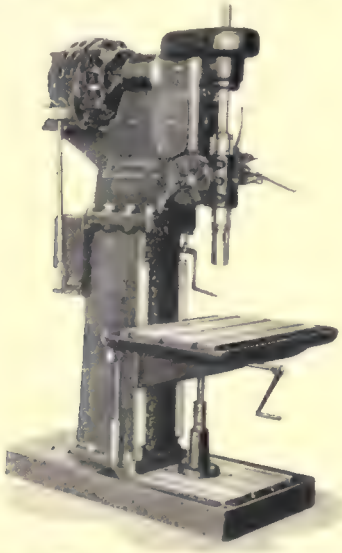
armatures such as are used on subways, elevated railways or interurban lines. The banding equipment is furnished with a device which can be adjusted to any given tension. An individual motor is used to drive each part.

# Machine Shop

## Ball Bearing Geared Drill and Tapper

BARNES DRILL COMPANY
814-830 Chestnut Street, Rockford, Ill.

CORRECT speeds and feeds for any one size of twist drill from ⅜ in. to 1½ in. can be obtained on the machine shown. Its direct-connected motor drive through a multiple disk clutch

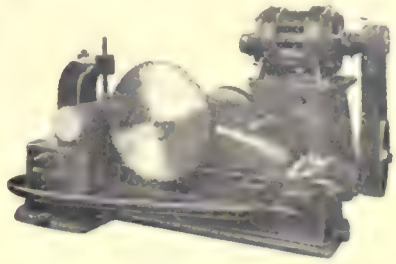


gear provides for simplicity and convenience of control. All important shafts have radial ball bearings and a fixed splined spindle has a roller thrust bearing. The self-oiling system lubricates all radial ball bearings and gears. The gearing throughout is alloy steel and all important gears are heat treated. A 5-hp., 1,200-r.p.m. motor is recommended. The star wheel handle is conveniently located on the right-hand side of the machine. A table with a finished working surface of 27 in. x 17 in. is surrounded by oil channels. The rack is dovetailed to the sleeve and no screws are used. A counterbalance chain facilitates the quick return of the spindle. An added feature is a safety device to prevent overloading and minimize breaking of drills. There is an automatic stop, giving full spindle travel. The height of the machine is 75 in. and it occupies a floor space 34 in. x 48 in. The net weight without motor and starter is 1,750 lb.

## Cold Saw Cutting-Off Machine

ESPEN-LUCAS MACHINE WORKS
Front Street and Girard Avenue,
Philadelphia, Pa.

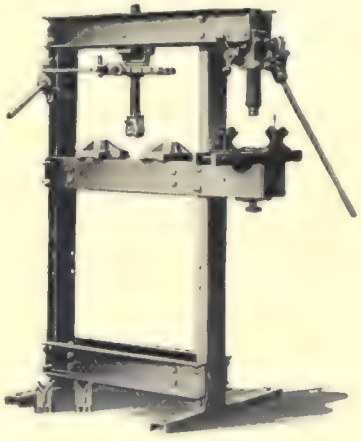
BARS, billets and other steel shapes can be sawed quickly on this machine. The housing and other principal castings are made of gray iron having thick walls and heavy webs. Spindle, driving gears and other working parts are made of high carbon steel forgings. The driving worm gear and main bearings are of bronze. Roller bearings take care of the heavy thrust. A self-priming pump supplies the lubrication for the saw. The feed, as well as the quick traverse in both directions, is accomplished by means of a low-pressure oil feed system. All speeds of traverse, including feed variation, are controlled by the movement of conveniently located levers. Automatic control can be had at the limits of the traverse, or at points determined by the operator. The machine can be operated by individual motor drive or from a countershaft, as desired.



## Forcing Press

MANLEY MANUFACTURING COMPANY
York, Pa.

CAPACITY of 35 tons is obtained in the new Manley Press. Five leverages are used to change quickly from one speed to another, thereby enabling the operator to use the power best suited for the job. To change the leverage it is only necessary to slide the retaining collar forward, lift the connecting link and drop the pin in the proper hole, using either the first, second or third leverage. The press has a winch-operated table which is raised or lowered through a chain



working on two drums and controlled by a handle. A counterweighted handwheel suspended on ball bearings is used. The frame is of an open type which permits of long work such as shafts, small axles, etc., passing through the frame in a central position for straightening.

Quite often a bearing is rusted or frozen so that pressure alone will not remove it. The upper end of the 4-pitch Acme thread screw used in the press is so placed that it may be struck with a heavy hammer without injury. The leverage of the press is in the ratio of 4,800 to 1. High-speed leverage is used when pressure up to 8 tons is required. Ten notches on the hand wheel are obtained at each stroke. The high-speed screw leverage eliminates the criticism against screw pressure being too slow. The lever bar is placed at a suitable working height for full muscular action when pulling on it. The stroke is also made with the operator in such a position that he can see exactly what he is doing and just what is taking place on the pressing job. The frame is of bolted construction.

An independent rack and pinion press is also furnished with this outfit and is a separate and complete unit from the screw press. This can be used for small work. Leverage on this press is 44 to 1 and it has a capacity of 3 tons. The floor space required is 30 in. x 52½ in.

## 3-Hp. and 5-Hp. Improved Pedestal Grinders

STANDARD ELECTRICAL TOOL COMPANY
1938-46 W. Eighth Street, Cincinnati, Ohio

ELECTRICALLY driven grinders of this type are made in two sizes, 3 hp. and 5 hp. capacity, A General Electric motor and GE push-button con-

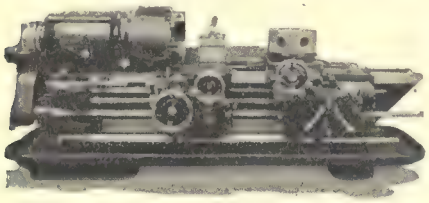
trol are furnished. The control is located on the inside of the pedestal or base of the grinder. The armature shaft is made of 3½ per cent high grade nickel steel. SKF ball bearings are used, incased in dust-proof chambers. Guards of the hinged door type with exhaust connections protect the emery wheel. The guards are equipped with a spark breaker, also a polished wire-glass adjustable eye shield.

The 3-hp. grinder is equipped with emery wheels 12 in. x 2 in. or 14 in. x 2 in., as preferred. The 5-hp. grinder is equipped with emery wheels 18 in. x 3 in.

## Turret Lathe

GISHOLT MACHINE COMPANY
Madison, Wis.

BED, headstock and bearing housing of this turret lathe are cast in one piece. By extending the headstock walls above the top of the turret housing an oil-tight reservoir is formed for the splash oiling system. The machine is driven by a single pulley. Eight



changes of speed are obtainable by means of levers located conveniently at the front. All gears are made of treated alloy steel and a multiple disk clutch transmits the power. The transmission shafts are mounted on ball bearings. An outstanding feature is the short distance between the bearings.

The full swing feature of the side carriage eliminates interference of the square turret with the tools of the hexagon turret. Aprons of both side carriage and turret carriage are self-contained, each having complete independent feeds, lead screw, rapid traverse, automatic feed and traverse trips, screw-cutting index, micrometer dials and selective feed levers. Each carriage and the cross slide have micrometer dials. The feeds are all positively geared and eight changes of feed, forward and reverse, are provided in each apron.

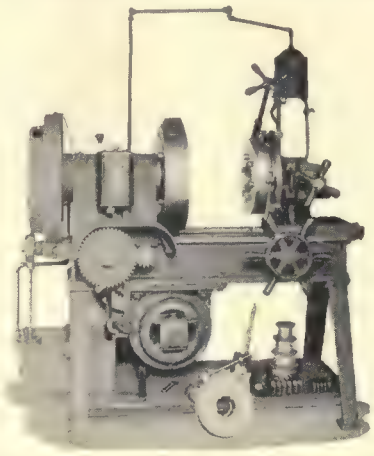
Independent longitudinal feeds permit the use of any one of the coarse or fine feeds of one carriage irrespective of the feeds on the other. One set of eight chain gears is provided for cutting all standard threads up to two per inch.

Each carriage has a separate rapid traverse independent of the feeds. The automatic feed trips are a feature. The 3-L machine occupies a floor space of 67 in. x 135 in. and the 4-L machine 80 in. x 190 in.

## Motor-Operated Pipe Threading and Cutting Machine

D. SAUNDERS' SONS, INC.
Yonkers, N. Y.

PIPE from ½ in. to 4 in. inclusive can be threaded and cut with the 4B machine, while the 5D machine cuts and threads pipe 1 in. to 6 in. inclusive. Where desired these machines can be furnished with a bolt-threading

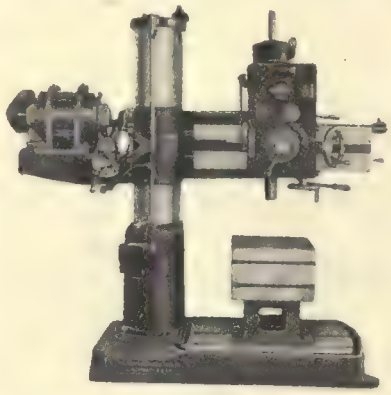


attachment. The machine is suitable for operation by either a.c. or d.c. A 5-hp. constant speed motor with a drum type controller designed for forward and reverse operation is direct geared to the driving shaft of the machine. Sufficient gear changes are furnished to obtain the correct cutting speed for all sizes of pipes within the capacity of the machine. The cutting off head is arranged with a tool slide and self-centering V jaws to steady the pipe being cut off. A handwheel connected to a rack and pinion moves the carriage containing the cutting off head and the die head. The die head slides on ways and permits it to be brought close to the gripping chuck for holding the pipe, which is of the standard universal type. The pipe is centered by a two-jawed self-centering chuck mounted at the rear end of the spindle on the side of the large driving gear. An automatic oil pump supplies a constant flow of oil to the chasers and cutting off tool.

## Heavy-Duty Radial Drill

MORRIS MACHINE TOOL COMPANY
Cincinnati, Ohio

MORRIS radial drills are arranged for electric drive with the motor mounted on the arm. They are made in sizes of 3, 3½ and 4 ft. The head is fully inclosed and balanced on the arm. The spindle is a hammered steel forging running in bronze bearings in the sleeve and driven by two keys. It is fitted with a ball thrust bearing and



the spindle gear is mounted on ball bearings. The helical spindle gears are made of alloy steel, heat-treated and hardened. Feed gears are of steel, heat-treated and hardened. The feed unit is mounted in the head. There are six feeds on the 3-ft. and 3½-ft. drill, ranging from 5 to 30 thousandths of an inch per revolution of spindle. On the 4 and 4½-ft. radial there are eight feeds ranging from 5 to 42 thousandths per revolution of spindle and four thread leads, 8, 11½, 14 and 18 threads per inch.

The tapping attachment and back gear bracket is a unit mounted on the back of the head. The back gears, back gear clutches, spindle gears and feed gears are made of chrome nickel steel, heat-treated and hardened. A sliding gear speed box is equipped with ball bearings. The alloy steel gears run in oil. A speed chart at the change-speed lever permits the operator to select quickly any one of the spindle speeds. The column or sleeve is mounted on an inner column which extends through to the top and revolves on ball bearings. The column is of semi-steel, ground to size. The arm is designed to resist torsional and lifting strains. The ribbed base is fitted with T-slots.

## Trailer Trucks

AMERICAN CAR & FOUNDRY COMPANY
30 Church Street, New York

TRAILER trucks of this type are especially designed to withstand heavy loads and rough usage. The frames are of channel and angle steel, hot riveted with corners gusseted. The bodies are of sheet steel reinforced with angles and bands. Cast-iron wheels with self-contained roller bearings and Alemite pressure lubrication are mounted on high carbon steel axles, heat treated to a Brinell hardness of 250. Pressed steel caps are shrunk on the ends of the wheel hubs, making a close fit around the axle, keeping out

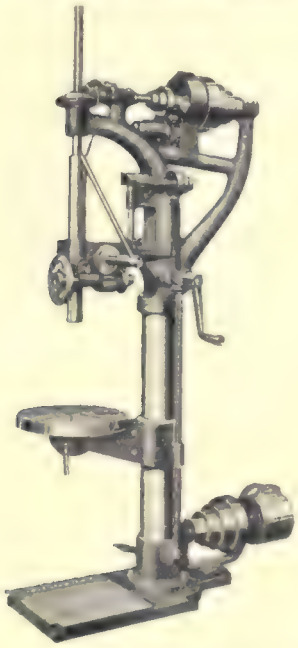
the dust and dirt. Each trailer is equipped with a rear drop forged gravity coupler hook to permit of train operation. Due to the counterweight it automatically locks and cannot be jarred open by rough roads.

These trailers are made with a gondola body or a dump body. The gondola body is adapted to the handling of miscellaneous loose material and crated or boxed material. The body has removable corner posts and if desired can be equipped with a special bolster for handling long material, loaded on two trailers. The dump body is self-clearing and automatically locks itself in the upright position after its return from dumping. The gondola trailer has a capacity of 6,000 lb. and the dump trailer has a capacity of 24½ cu.ft. or 6,000 lb.

## Back Geared Upright Power Drill

BUFFALO FORGE COMPANY
Buffalo, N. Y.

INSTANT change from a plain to a back gear drive without using a wrench is possible in the machine shown by disengaging a knurled knob in the top gear and throwing in the back gears with a hand lever. A locking screw is provided for holding it in



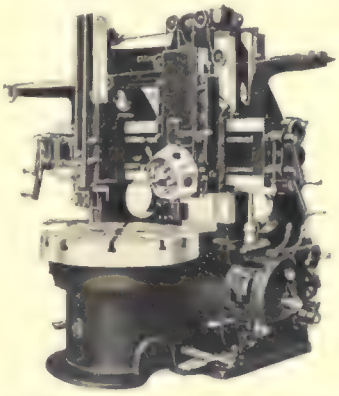
place. An adjustable automatic trip throws out the power feed when the piece has been drilled to the required depth.

The ball bearing spindle is graduated and ground. The lever handle is adjustable from 6 to 18 in. and is held in place by a tension spring. All bearings are split and adjustable for wear. The latch hinged worm feed wheel runs in oil. All gears are machine cut and are fitted with heavy bronze bushings. With spindle travel of 14¾ in. the machine is amply fitted to handle reboring work with ease. It weighs 1,100 lb. If desired, the machine can be furnished with a direct-connected motor.

## Vertical Boring and Turning Mill

GISHOLT MACHINE COMPANY
Madison, Wis.

TWO plain swivel heads are features of the machine shown. A driving pulley is geared to a friction back-geared headstock having six mechanical speed changes which, in connection with a two-speed countershaft, provides



twelve changes of speed to the table, all in geometrical progression. The plain table has four pairs of parallel and four radial T-slots. The feed change levers, rapid traverse levers and table control levers are located on both sides of the machine together with a foot brake at either side. Two plain independent heads, furnished with the machine, can be swiveled to any angle from 45 deg. from the vertical. The ram is a box section type having a 3½-in. central core extending through the entire length. The bore for the tool holder is 3 in. diameter. Ten mechanical changes of feed are obtainable for each head. A feature is a device to eliminate breaking of gears and other parts. The micrometer index dials reading in thousandths of an inch facilitate accurate setting of tools.

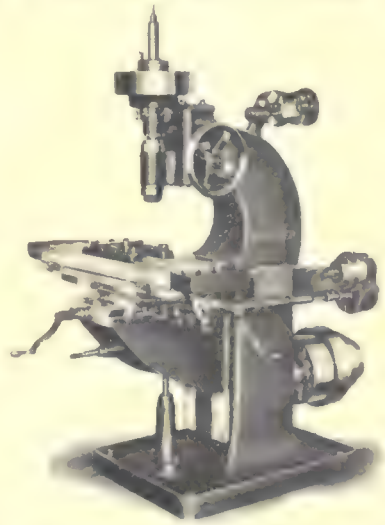
A feed tripping device stops the feed automatically at any predetermined point. In addition, safety stops trip the feed before the head reaches the end of the travel. Rapid traverse enables the operator to move the head quickly by power in either direction. The ratchet handles on the feed rods disengage automatically when the feed or rapid traverse is used, thus eliminating chance of injury to the operator caused by revolving handles. All feed gears and other gears subjected to heavy duty are made of steel. A two-speed tight-and-loose pulley countershaft is standard, but a motor drive is easily installed without increasing the floor space occupied, which is 97 in. x 120 in.

## Improved Die Sinker and Vertical Milling Machine

REED-PRENTICE CORPORATION
Worcester, Mass.

LIKE other Becker machines, the model shown is supplied with an adjustable auxiliary head which keeps the spindle in perfect alignment. The spindle is made of high-grade steel with ground main bearings running in taper bronze bushings, adjustable for wear. Belt pressure of the spindle guiding pulley is taken by ball bearings supported in brackets at the top of the column. The main spindle has ball bearings at top and bottom. The table, of liberal proportions, has power longitudinal feed in either direction. The feed of the table is through a pair of three-step cones. Two additional changes can be effected by means of a pull gear on the feed box, to which the telescopic shaft is attached. Head, table, carriage and knee are furnished with adjustable gibs for taking up wear. The machines can be arranged for a single pulley gear box drive, if desired, which will permit of a direct drive from the main line without a countershaft. This machine is also suitable for direct motor drive. Where a constant speed motor is installed, it is necessary to provide a gear drive. This drive will provide fourteen spindle speeds ranging from 20 to 500 r.p.m. The quick changes in speed are obtained through two handles conveniently located on top of the gear box. For this method a 3-hp. constant-speed motor of 1,150 or 1,200 r.p.m. is recommended.

Where a variable speed motor is furnished it is not necessary to provide a gear box, since a spindle variation from 25 to 500 r.p.m. can be secured by



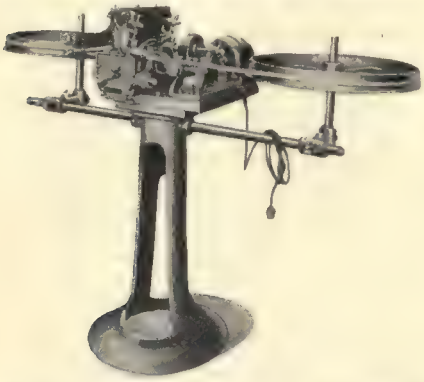
means of shifting the handle of a regulating rheostat, located on the side of the machine.

The floor space required for this machine is 74 in. x 60 in. x 75 in.

## Machine for Filing and Setting Band Saws

WARDWELL MANUFACTURING COMPANY
110-112 Hamilton Avenue, Cleveland, Ohio

FILING, setting and joining of band saws all in one operation can be done by this machine. It will handle saws from ½ in. to 2 in. wide. Motor or



belt drive can be furnished as desired. By the positive and powerful movement of the file all spring or medium tempered band saws can be accurately filed and set at a speed of 70 ft. a minute.

## Circular Relief Grinder

CLEVELAND TOOL ENGINEERING COMPANY
Main and West 25th Streets, Cleveland, Ohio

YEARS of experience, development and expert engineering are claimed to have produced an original circular relief grinder that effects economy unapproached by the older methods of relief grinding. It has proved its

worth in time, labor and money saved and in superior precision of the work.

Grinding of the relief in a proper and economical manner can be performed on such tools as adjustable reamers, tapper taps, milling cutters, face mills and boring heads, core drills and various other tools. Where two or three distinct operations are usually needed to grind tools, it is said that the grinder shown will perform the entire work in one operation. The outside face of the wheel is dressed concavely to exactly the same curve as the tool to be ground. The tool is then offset from the center of the wheel curve to give the desired clearance. Then it is ground to the cutting edge. The circular relief leaves the outside of the tool convex with all the metal possible to support the cutting edge. The clearance is determined by the distance the tool is moved in or out against the curve of the grinding wheel.

# Sheet Metal and Forge Shop Equipment

## Power Ring and Circular Shear

PECK, STOW & WILCOX COMPANY
Southington, Conn.

CIRCLES or internal rings and irregular curves can be cut on this ring and circular shear. Clamping disks are provided with center points and blanks and are held securely between clamping disks and released through an eccentric lever. The circle arm moves easily and freely by means of a

rack and pinion and hand crank. The angular position of the cutter and the ability to raise and lower the upper cutter through a handwheel enable one to cut circles from square blanks, or to cut inside circles without cutting the outer edge. This machine is furnished regularly with tight and loose pulleys.

## Turning, Wiring and Burring Machine

PECK, STOW & WILCOX COMPANY
Southington, Conn.

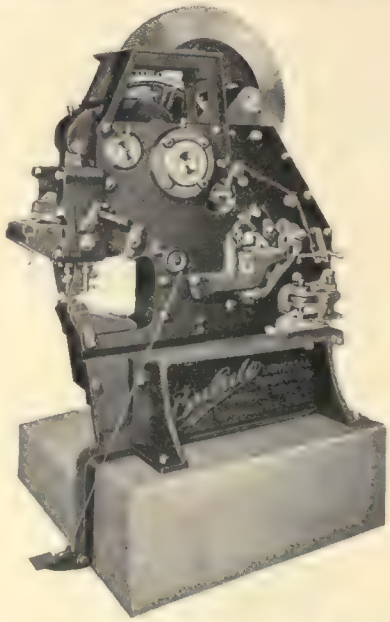
VARIOUS operations can be performed with the necessary additional rolls by this self-contained unit. With the belted motor drive the speed of rolls for turning, wiring or burring operations can be changed by simply

changing the size of the motor pulley. It has a capacity for No. 16 gage steel and lighter and its turning capacity is for No. 16 gage steel with ¼ or $\frac{3}{16}$-in. wire or No. 18 gage steel with $\frac{3}{16}$-in. wire. With wiring rolls the capacity is No. 16 gage steel with ⅛-in. to $\frac{3}{16}$-in. wire and with burring rolls No. 16 gage steel. The machine is furnished with a pulley drive and treadle friction clutch attachment. All bearings are bronze bushed.

## Armor Plate Universal Iron Workers

BUFFALO FORGE COMPANY
Buffalo, N. Y.

BUFFALO armor plate universal iron workers are complete, reliable and modern machines for cutting metal. With one of these, rounds, squares, angles, tees, beams and channels can be cut and shear plates, flats, girders, H-columns, I-beams and angles punched. With a few special tools,



angles, channels and I-beams can be coped. These machines are made in four sizes, No. ½, 1, 1½ and 2. The same design is used on all models. There is a punch at one end and a slitting shear at the other with a bar cutter adjacent to the shear. The machines are supplied with a high and low die block and long and short punch holder. The triple punching attachment may be used on the machine if desired. The shear knives are suitable for slitting plates of any width or length as well as for flats. An exclusive feature of the machine is the stripper used on the shear.

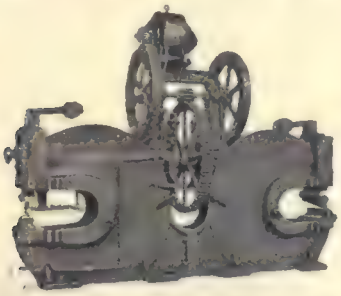
This is operated by means of a crank requiring no tools and is very wide to permit cutting short pieces of plates or flats. The bar cutter has five-piece knives so that replacement and sharpening are easy and inexpensive.

These machines, like all other Buffalo metal working machines, have frames of rolled steel armor plate, guaranteed forever against breakage. Due to the heavy cast-iron base a concrete foundation is unnecessary. The gear and pinions are made from machine cut steel.

### Punching and Shearing Machine

LONG & ALLSTATTER COMPANY
Hamilton, Ohio

PUNCHING and shearing machines of this type have the slide counterbalanced and fitted with a bronze gib for taking up wear. Camshaft and pintle are made of steel. Bronze bushed bearings are furnished for the main journal and the cam pintle. The clutch is made of high-carbon cast steel and



the face is fastened to the main spur wheel by means of a tongue, groove and bolts. It is detachable, providing for renewal of worn parts. An automatic stop will throw out the clutch at the completion of each stroke and may be adjusted for any point of the stroke desired. The camshaft may be turned by hand for any adjustment.

### Standard Blacksmith Forge

BUFFALO FORGE COMPANY
Buffalo, N. Y.

FORGES of the type shown are equipped with the No. 200 ball-bearing silent blower with a 14-in. fan. The forge has a cast-iron hearth mounted on four steel pipe legs and reinforced with cross-bar braces. A steel half hood vulcan tuyère is part of the regular equipment. The gear ratio of the blower is 47½ to 1. The fire pan is 28 in. x 40 in. and the net weight of the entire outfit is 273 lb.

### Oil-Burning Rivet Forge

BUFFALO FORGE COMPANY
Buffalo, N. Y.

INCONVENIENCE and danger from flying sparks in heating rivets are overcome by using the oil-burning rivet forge shown. This forge consists essentially of a welded steel oil tank on which is mounted a head or fire chamber. This head is made up of a cylindrical steel plate housing held between cast-iron top and bottom plates by means of three through bolts. The lining is a one-piece circular firebrick 2 in. thick made of the best quality of refractory material. To replace the old lining it is necessary only to unscrew three nuts and lift the top off the fire chamber. The oil tank is tested with air at a pressure of 125 lb. Air is supplied through a single connection which furnishes pressure for the oil supply as well as air for the atomizer.

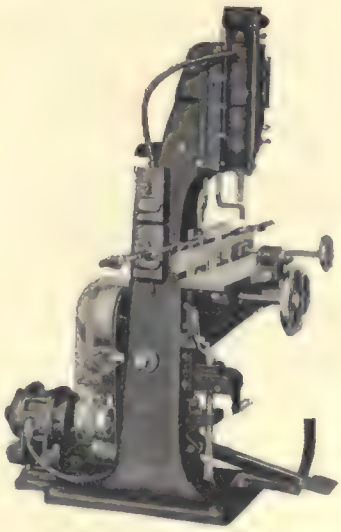
It will burn kerosene, distillate, or any fuel oil. The tank has two convenient handles, one on either side. A forge mounted on a truck as shown makes an ideal arrangement for portability.

## Woodworking Machinery

### Power Feed Hollow Chisel Mortiser

OLIVER MACHINERY COMPANY
Grand Rapids, Mich.

USE of a rigid, hollow, box type, one-piece casting having a wide flanged floor support for the column features this hollow chisel mortiser. The column incloses the power feed mechanism, with the exception of the drive pulley. A built-in fan blower behind



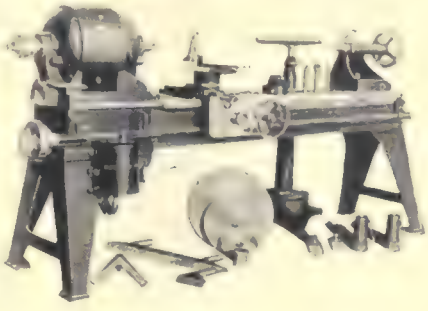
the column furnishes a constant air blast for cooling the tools and keeping the work free from chips. The mortising ram or plunger reciprocates in adjustable gibbed ways and has an adjustable travel from 2½ in. to 4 in. long, controlled by the treadle for single or continuous power feeding strokes. The machine will handle chisels from ¼ in. to ¾ in. square. Hollow chisels with 4-in. blades will mortise in 12-in. high material.

A universal compound table with screw clamp for 6-in. wide stock and a handwheel, rack and pinion for longitudinal travel, gaged by adjustable stops, are regularly furnished. The table is 36 in. long, 6 in. wide, 32 in. above the floor at the lowest position and 44 in. at the highest. It is fitted with a vertical adjustable back fence having a lip hold down and carries a 6-ft. layout stop rod with six spring stops for automatically locating mortises. A rod and two adjustable stops directly in front of the table govern the length of the mortises. The floor space required for the machine is 3 ft. x 5 ft.

### Motor Head Pattern Lathe

OLIVER MACHINERY COMPANY
Grand Rapids, Mich.

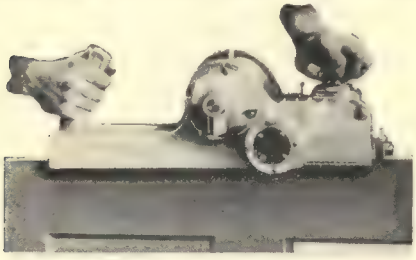
PATTERN lathe No. 25, shown in the illustration, is made in three sizes, 16 in., 20 in. and 24 in. swing. The head incloses an Oliver direct-current motor of 2-hp. capacity whose speed can be varied from 400 to 2,000 r.p.m. The armature shaft is made hollow for faceplate work and with suitable take-up for end thrust. The front end of the shaft is bored for Morse taper. Ordinarily a drum type controller with proper resistances is attached to this machine. The tailstock is made with a strong spindle and bored for Morse taper. The iron bed can be furnished in any length from 6 ft. upward, advancing by 2-ft. sections. All sizes of lathes are provided regularly with power feeding carriages, but hand-feeding carriages can be substituted.



## Electric Hand Plane

WAPPAT GEAR WORKS
Meade Street and Braddock Avenue,
Pittsburgh, Pa.

THIS electric hand plane can be used on doors and sash. The cutting is done by a jointer head which is driven through gears from a $\frac{3}{10}$-hp. universal type motor that operates from any light socket. The short shoe at the

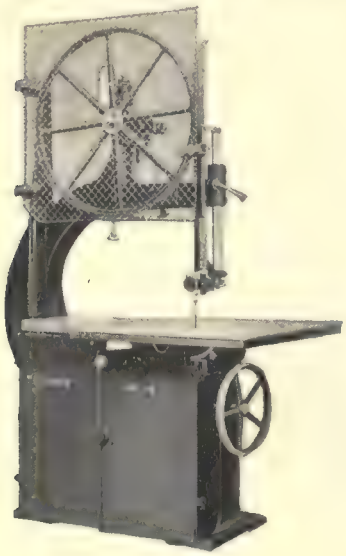


front of the plane and just ahead of the cutter can be raised or lowered by turning a knob with the left hand, thereby regulating the depth of cut. A graduated dial at the base of the knob enables the operator to set the knife for any cut from zero to $\frac{1}{8}$ in. This adjustment feature is unique in that by turning the knob forward or backward while advancing along the material it is possible to vary the depth of the cut and smooth out any high spots in one stroke. Another interesting feature is the beveling attachment, which can be set to cut accurately any required bevel on the edge of a door or sash. The body of the tool is aluminum and the total weight is 19 lb. It is easy to handle and simple to operate. The high speed blades in the cutter are easily removable for sharpening.

## Band Saw

OLIVER MACHINERY COMPANY
Grand Rapids, Mich.

BASE and column arm of this machine are cast in one piece. The main table is carried on rockers for the angle adjustments. The table can be tilted both ways by means of a worm gear and hand wheel at the right of the operator. An auxiliary table is supplied between the column and the work table. The upper and lower wheels, of 38 in. diameter, are made of cast iron. The lower one is inclosed in a metal



casing, provided with two doors. The wheel shafts are fitted with machine ground journals and are mounted on tapered babbitted bearings. Each bearing has an oil well and cap. The upper shaft and bearing are adjustable vertically to suit various lengths of blades.

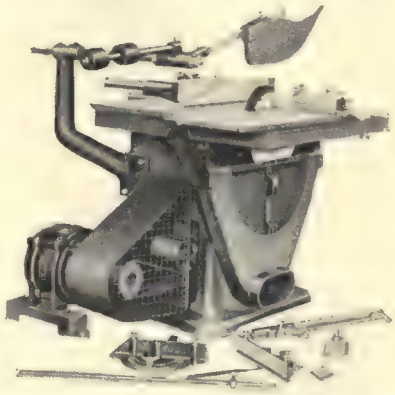
An outboard bearing which supports the lower wheel shaft is bolted to the frame. Saw tension is adjusted by a telescope spring. A guide post made of square steel is counterbalanced by an incased coil spring and can readily be locked in a fixed position. A grooved wooden saw guard on the column protects the saw on both sides. A steel front guard with a wood facing is carried on the guide post and covers the saw above the guide.

The main table is 36 in. x 40 in. and is designed to tilt 45 deg. to the right and 5 deg. to the left. The auxiliary table is 21 in. x 22 in. The floor space occupied by the machine shown is 68 in. x 54 in.

## Universal Saw Bench

OLIVER MACHINERY COMPANY
Grand Rapids, Mich.

UNIVERSAL saw bench No. 90 is furnished with a cored form ribbed for strength with a wide flange at the base. A metal partition divides the saw from the balance of the working parts and prevents the sawdust from penetrating to them. The metal table has two sections, one stationary and the other arranged to slide past the saw. An extension bracket at the right supports the fence when ripping stock the maximum width. The table will tilt to an angle of 45 deg., the movement being controlled by means of a handwheel engaging a worm and gear. The movable table is mounted on a



tongued cross slide and moves past the saw for use in cutting off and for dado work. The cross slide is gibbed to main table frame and can be drawn 4 in. away from the saw line so dado heads and grooving saws may be used. The stationary section of the table is graduated its entire width in eighths and the sliding section is graduated into degrees.

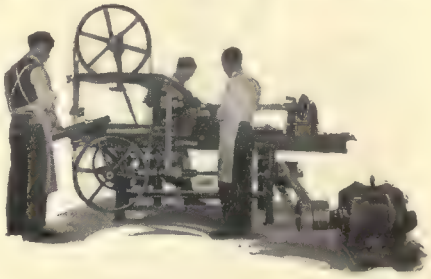
Two crucible steel machine ground arbors fitted into bearings are lined with interchangeable sleeves having oil wells and wick conveyors that keep them flooded with oil continuously. The arbor pulleys are of the pneumatic type, machined and balanced.

The universal ripping fence may be used on either side of the saw or secured at any angle not in line with the saw, on either the stationary or the rolling table. It has a quick adjustment of 12 in. without changing the locating pins to the next set of holes. A micrometer will set the bench to and from the saw for fine and extremely accurate adjustment. It has a parallel adjustment whereby it may be set to or from the operator 9 in. A miter and cut-off gage on the sliding table swings to an angle of 30 to 135 deg. It has 18-in. and 36-in. auxiliary rods and stops for determining lengths to cut off. Two universal gages are supplied for the table grooves each side of the saw. They are graduated from 30 to 150 deg. The machine has a capacity to rip 22 in. wide, cut off 34 in. wide up to $1\frac{1}{2}$ in. thick. The 14-in. saw projects through the table 4 in. The machine with motor brackets occupies a floor space of 4 ft. 1 in. x 5 ft. 6 in.

## Complete Woodworker

BUFFALO FORGE COMPANY
Buffalo, N. Y.

TEN machines in one is the manufacturer's description of the woodworking machine shown. It includes a rip and cross cut saw, a band saw, a planer, jointer, shaper or edge molder,



a lathe, a drill and a sander. A grinder can be furnished at extra cost. Three men can work on it at one time without interference with one another. Practically any woodworking operation can be performed.

Tight and loose pulleys are provided on the main shaft at the left of the cone pulleys, below the table. This construction makes it possible to run the belt up through the table to a lineshaft or motor overhead. There are three distinct parts to the machine, which may be operated together or individually. One is a lathe which is used also for drilling and grinding. The second is the band saw, and the third the arbor used for circular saw, planer, sander, jointer and shaper. These main parts are engaged by three conveniently arranged clutches. The main driver is provided with a belt shifter which can be operated from either side of the machine. With all parts of the woodworker operating at the same time only 4 hp. to 5 hp. is required.

An adjustable mandrel furnished can be run horizontally or vertically and on it may be inserted planer and dado heads and circular saws or knives of any size. It is made of cold rolled steel and carefully machined. A planer table is made in two parts which fit into the channel on the main table. An adjustable guide for the planer is furnished which can be set at a 90-deg. angle with the table top or tilted back to allow planing at an angle. The planer slides are 29x10 in. and 21x10

in., respectively. By raising the mandrel to a vertical position a shaper is obtained on which any kind of knives may be used. Rip and cut-off saws of 12 in. diameter are furnished with the machine. Cuts of any size or desired depth up to 3½ in. may be made. The removable gage for cross-cutting has a quadrant which permits adjustment for sawing at any angle from 30 deg. to 90 deg. The lathe will handle work up to 20 in. diameter by 40 in. long. Four step cone pulleys, of 5½, 7½, 9¾ and 12 in. diameter respectively, are an essential part of the lathe. A clutch is provided on the lower cone pulleys. A band saw table is cast in one piece with the main table. It measures 29½ by 30 in. The saw wheels are 27 in. in diameter and the maximum clearance below the guide is 15 in. A ½-in. band saw is furnished with the machine. The band saw is as strongly constructed as it would be in an individual machine, the shaft diameter is 1⅜ in. and the upper bearing is 10 in. long.

# Track Maintenance Tools

## Oil Preheater

ALEXANDER MILBURN COMPANY
1416-1428 West Baltimore Street, Baltimore, Md.

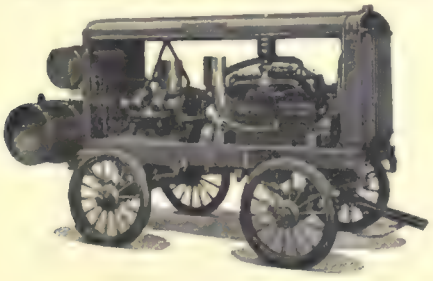
CASTINGS can be heated prior to welding, tar kettles can be heated, pipe can be thawed, etc., with the Milburn preheater. The oil burner is of the atomizing type, utilizing crude, fuel, kerosene oil or distillates, and

compressed air varying from 50 to 100 lb. pressure. The tank is constructed of heavy gage steel and the bottom is welded. Two handles welded to the tank facilitate handling. The weight of the unit is 60 lb. The outfit consists of a 5, 12 or 22-gal. reservoir, an atomizing burner, 25 ft. of air hose with couplings, 25 ft. of special composition oil hose with couplings, oil pipe feed line, air pipe feed line and suitable valves for air regulation.

## Portable Air Compressor

SULLIVAN MACHINERY COMPANY
122 South Michigan Avenue, Chicago, Ill.

COMPRESSED air is supplied at the rate of 220 cu.ft. per minute by the four-cylinder V-type compressor shown, which is direct connected to a Buda engine. The parts, together with an air receiver, gasoline fuel tank and radiator, are mounted on a steel frame with sheet steel canopy top and removable side covers. The wheels and truck are a matter of selection. All compressors in the line are single acting and employ a Sullivan "wafer valve." They are automatically lubricated and have water-cooled cylinders, barrels and heads. The flywheel and crankshaft assembly are carefully balanced on a special machine. The compressor is said to be a new departure in design, the V-type arrangement of cylinders adopted entirely eliminating vibration and decreasing the weight. Each of the four cylinders is 6½ in. x 5¼ in.

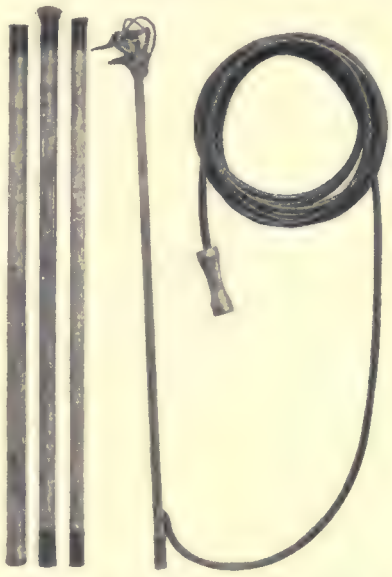


The Buda engines are four-cylinder machines provided with four-point suspension. They can be equipped to use kerosene instead of gasoline if desired.

## Contact Hook and Pole

RAILWAY TRACK-WORK COMPANY
Clementine, Thompson and Mercer Streets, Philadelphia, Pa.

PIVOTED jaws 5 and 6 in. long, of special composition, grooved to grip the trolley wire above and below are features of the Ajax contact hook and pole. The weight of the pole clamps



the jaws on the wire. The lower jaw comes in contact with the clean undersurface of the trolley wire, preventing arcing and burning. When in position on the trolley wire, cars can pass without removing the pole. When the pole is raised, the lower jaw drops behind the guide lug, so that the upper jaw slips on the trolley wire into position for clamping. The lower end of the pole can be rested in any convenient position to clear passing cars. The contact will handle 300 amp. without injury to the wire.

## Chausse Model E-3 Portable Asphalt Repair Plant

CHAUSSE OIL BURNER COMPANY
West Beardsley Avenue, Elkhardt, Ind.

MODEL E-3 asphalt repair plant is an improved development of the model E-1 and E-2 machines. It permits of laying hot asphalt and is suitable for large or small patchings or for supplementing stationary plants. The machine may be used as an independent unit directly where the repair work is being done as it is self-propelled on rubber-tired wheels and contains ample storage for raw material.

The plant is equipped with a Continental motor, small Kellogg air compressor for fuel-line pressure, S.K.F.

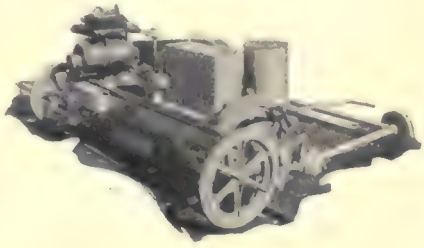
ball bearings on the sand drier, high-pressure lubricators on all other bearings, Cotta transmission, twin disk clutch, Geneva wheels and standard solid rubber tires.

The capacity of the plant is rated at 150 sq.yd. of 2-in. compacted mix per eight-hour day. Old asphalt can also be reclaimed during regular operations. A tool heater with an oil furnace is located at the rear of the machine. Bins provide for the storage of 135 gal. of asphalt, 2¼ cu.yd. of mineral aggregate, 1,750 lb. of cement or lime dust, 50 gal. of kerosene and 9 gal. of gasoline. The light weight of the machine is 9,400 lb.

## Rail Joint Grinder

RAILWAY TRACK-WORK COMPANY
Clementine, Thompson and Mercer Streets, Philadelphia, Pa.

BLOCKS of abrasive material 10 in. x 4 in. x 2½ in. with a steel pin inserted in one end are used in this machine. Two blocks are used in one setting of the machine, providing a grinding surface of 8½ in. x 2½ in. The blocks are placed endwise in the crosshead or brick holder which slides bodily in guides. It is reciprocated over the rail by means of a simple rocker arm movement at a speed of 340 strokes a minute. As the blocks wear, the end wedge is slackened by turning the small hand wheel over it, while the blocks are fed downward by means of the large hand wheel operating the feed screw directly over the blocks. With the long straight grinding surfaces it is impossible to grind the low spots. A 3-hp., 600-volt direct-



current constant-speed motor is used for driving the grinder. Turning the hand crank at the right of the machine lowers the derail wheels to the pavement and raises the grinder from the track, supporting 95 per cent of the weight so that the operator can lift the outrigger end of the machine and roll it off the track. The grinder weighs 1,350 lb. complete. The outrigger is hinged so that it can be raised vertically for storage or transportation.

## Portable Oxyacetylene Plant

ALEXANDER MILBURN COMPANY
1416-1428 West Baltimore Street,
Baltimore, Md.

WELDING, cutting or a combination of the two can be done with the Milburn portable oxyacetylene plant. The truck is made to accommodate the small or large sized oxygen

or acetylene tanks. The truck illustrated is constructed of heavy steel angles bent and strongly welded to withstand rough usage. The diameter of the wheels is 16 in. A strong chain welded to the frame of the truck holds the cylinders in place so that there is no danger that they will slip when in transit.

## Automatic Rotary Track Grinder

RAILWAY TRACK-WORK COMPANY
Clementine, Thompson and Mercer Streets,
Philadelphia, Pa.

ROTARY track grinders of the type shown are automatic in travel. The motor and grinding carriage are mounted in the center of the machine, which travels along the track at a speed of 30 in. per minute when grinding. Its movement can be reversed for any length of travel. By means of a

clutch operated by a hand lever the speed is increased to 100 ft. per minute for moving the machine from one joint to the next. Two shoes 16 in. long are attached to the frame on which the machine rests. The shoes have openings through which the track wheels extend. By means of a heavy spring over each wheel, any tension can be applied so as to distribute the weight equally over the shoes and track wheels.

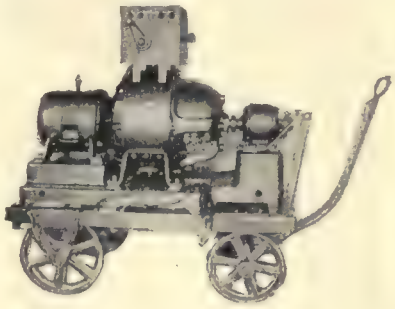
The machine is controlled from the operator's seat. Within his reach is a handwheel for feeding and one for tilting the grinding wheel, a hand lever for instantly or gradually raising the grinding wheel to obtain a run-off on the rail head and also the lever to control the lateral adjustment of the grinding wheel. The long lever shown at the left of the machine is for raising the machine from the track to the two roadway wheels to allow cars to pass.

A substantial silent chain drives the wheel arbor direct from a 5-hp. motor. The machine accommodates grinding wheels 14 in. in diameter by 2½ in. or 3 in. face. The grinding wheel arbor is operated on ball bearings with dust-proof caps. The outrigger is hinged for raising when transferring the machine or transporting it on a truck.

## Single Operator Arc Welding Equipment

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
East Pittsburgh, Pa.

PORTABLE 200-amp. single operator welding equipment as shown is an entirely self-contained unit. The control of the welding current is simplified so that only one handle rotating through 360 deg. is required for adjustments. The apparatus is mounted on a truck and the sturdiness of the various parts insures against breakage and accident on account of rough handling



to which such apparatus is usually subjected. The generator will deliver 200 amp. at 25 volts to a resistance load for one hour with a temperature rise not to exceed 50 deg. C. Its continuous rating is 93 per cent of its one-hour rating with the same temperature rise and the same voltage. It will deliver 275 and 300 amp. at the arc for welding duty. The generator operates at arc voltage and no external resistance is required in the circuit. The generator is designed to stabilize the arc inherently, thereby eliminating the necessity for automatic moving devices such as relays, solenoid-controlled resistors, etc. Either a direct-current motor or an alternating-current motor may be used, depending on the characteristics of the supply circuit. The driving motor and the generator are mounted on a common shaft and bed plate. To eliminate bearing and shaft troubles the exciter is coupled to the common shaft by means of a special flexible coupling and is supported by an extension of the common bed plate. Ball bearings of the radial type are used throughout, which allows the equipment to be operated in any location without danger of oil spilling and without the necessity for exact leveling. The complete control equipment for starting and regulating the current output is contained in a steel cabinet mounted on top of the generator. This company also manufactures arc welding rheostats for railway use as well as multiple operator equipment for manufacturing plants.

## Electric Arc Welder

RAILWAY TRACK-WORK COMPANY
Clementine, Thompson and Mercer Streets,
Philadelphia, Pa.

COILS of a high resistance wire, supported by insulator bars, which in turn are carried by a light but sturdy steel angle frame, form the essentials of this arc welder. At one end of the frame is mounted a switchboard to control the current. The unit is light and

portable, having large capacity with ample ventilation and accessible parts. The Ajax welding machine type RWY weighs approximately 120 lb. It is 18 in. x 28 in. x 36 in. The type IND machine weighs approximately 55 lb. Its size is 15 in. x 20 in. x 25 in. The hinged handles for carrying the machine drop parallel to the corner posts when released. Regulating switches provide a range of current from 19 to 333 amp. under normal line voltage with intermediate steps of 18 amp. each. If the line voltage drops to as low as 300 volts, 209 amp. can be obtained. It is claimed that the resistance wire used will not oxidize. A shunt switching device controls the several groups of coils independently, whether the full length of the coils is in operation or they are shunted. By means of the switchboard, 36 different values of current can be obtained. A sheet steel truck mounted on four rubber-tired ball-bearing wheels can be furnished if desired. This truck has compartments in the bottom for carrying a supply of welding rods and a box in the front for accessories.

## Heavy-Duty "Busters" for Breaking Concrete

SULLIVAN MACHINERY COMPANY
122 South Michigan Avenue, Chicago, Ill.

SULLIVAN "Busters" are designed to meet the wide and increasing demand for a one-man compressed air tool to do quickly and cheaply such work as breaking up concrete, cutting asphalt, excavating frozen ground in trenches, etc. The DW-221 type weighs 75 lb., is economical of air and runs with little vibration. It uses a 1⅛-in. steel with plain hexagonal collar shank and requires a ¾-in. air hose connection. Characteristic features are the valves and piston motion, automatic differential pressure lubricator, inclosed dust-proof chuck, steel retainer, all-steel construction, light-weight, rapid action, positive control of the piston and the hard powerful snappy blow in parts through the piston. The valve mechanism is secured in the chest by side rods, and the valve buffers are made of heat-treated tool steel to resist shock and breakage. The pistons are made from bar stock of alloy steel and

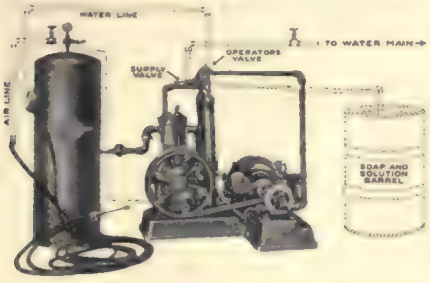
ground to fit the cylinders, which are solid drop forgings. The chuck and chuck bushing are inclosed in a dust-proof housing. Ample lubricating ports are provided in addition to the automatic lubrication incorporated in the machine.

# Bus Repair Equipment

## Car Washing System

CURTIS PNEUMATIC MACHINERY COMPANY
St. Louis, Mo.

THE Curtis air-mist car washing system is furnished with a 4½-in. x 4½-in. water-cooled compressor belt connected to a 5-hp. motor. The self-contained compressor is fully inclosed to protect the working parts from dust and dirt. The crankshafts and connecting rods are made from steel forgings. The cylinder head and valves are water




cooled and a radiator of suitable proportions is provided. The valves are of the light disk type, tempered, ground and polished. The valves seat on a phosphor bronze flat seat of a large area and can be removed independently without taking off the cylinder heads or loosening the pipe connections or fittings. An air pressure governor is part of the equipment. When the maximum pressure in the tank is reached the governor unseats a suction valve and the compressor runs idle until the tank pressure has dropped 5 or 10 lb. A centrifugal unloader prevents the motor from being started under load. The oil in the crankcase is picked up by knife blade throwers on the crankshaft.

The equipment furnishes a full force spray for washing the undersides of fenders and chassis and a soft or mild spray for washing the body. The adjustment is made by turning the operating valve. A third position of this valve will shut off the water. A supply valve permits of the withdrawal of water from a barrel or tank or from the regular water service line as desired.

The equipment shown is furnished in only the one nozzle type. The whole unit, including the air tank, can be installed in a floor space of 3 ft. x 7 ft.

## Universal Motor Stand

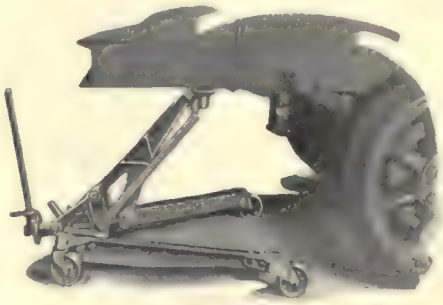
MANLEY MANUFACTURING COMPANY
York, Pa.

GASOLINE motors placed on the stand shown can be turned by one man into any convenient position to facilitate his work. The three-point suspension bar, of which two are furnished with the stand, is an important improvement. These suspension bars make it easy to mount and balance practically all types of three-point suspension motors. In addition to this a set of brackets slide on the side members for ready mounting of four-point suspension motors. A cone clutch installed on the top of the upright permits of locking the side rails to any desired position.

## High-Lift Jack

WEAVER MANUFACTURING COMPANY
Springfield, Ill.

UNUSUAL range of lift is found in a sturdy, dependable jack designed with increased capacity for handling buses and trucks. This jack incorporates all of the good features which made the previous models popular, as well as many new ones. The lifting arm, of the screw hoist type, is raised and lowered by a traveling



nut attached to the end of the arm. The handle operates a wheel on the end of the shaft through a ratchet and dog. It has a capacity of 8,000 lb. and a lifting range of 40½ in. The screw extension permits a lift to be applied directly to the chassis frame in spite of low running board or gas tank. Accidental release of the load is impossible due to a special locking mechanism. A broad wheelbase prevents tipping.

## Power Tire Spreader

WEAVER MANUFACTURING COMPANY
Springfield, Ill.

QUICKER and easier means for spreading pneumatic tires up to 10½ in. for inspection and repairs without danger of injuring them is possible by use of the machine shown. A feature is the method of spreading the tire naturally over the convex buffing plates with an outward and downward motion without subjecting the tread to any undue strain. Operation of the spreader by compressed air permits the repairman to devote his entire atten-

tion to the inspection of the tire. The device does not have to be bolted to the floor, since it is designed to support the largest and heaviest tires without the possibility of being overbalanced. Shipping weight of the spreader is 253 lb. and it occupies a floor space of 15 in. x 26 in.

## Truck Ambulance

WEAVER MANUFACTURING COMPANY
Springfield, Ill.

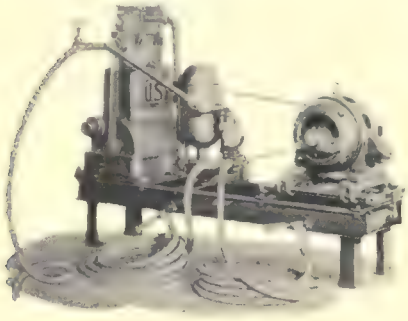
PROVISION for quicker, easier and safer pulling of disabled buses and trucks is given as the reason for the design of the truck shown. The load is supported by a 2½-in. high-carbon-steel axle held to the frame by two heavy U-bolts. The wheels are supported on the axle by dustproof ball bearings which take the radial weight of the load and the thrust strain. Heavy double tires mounted on 16-in. diameter wheels 8½ in. wide insure strength as well as lack of vibration and noise

when towing. The cast-steel yoke which supports the load turns on a pivot, permitting guidance by the tongue. Interchangeability of saddles permits of center variation from 19¼ in. to 28¾ in. This truck can be readily attached to rear or front axle. The pole is of telescoping design and its length can be adjusted from 7 to 13 ft.

## High-Pressure Washing Machine

UNITED STATES AIR COMPRESSOR COMPANY
Cleveland, Ohio

SEVERAL models of this washing machine are built. The one shown is a two-gun unit. Other models developed are the AW-Jr., which is a one-gun machine, and the AW-4, a four-gun machine. The equipment is capable of increasing the normal city water pressure of about 40 lb. to more than 300 lb. continuous pressure with the gun wide open. It is said that this pressure will remove the most stubborn



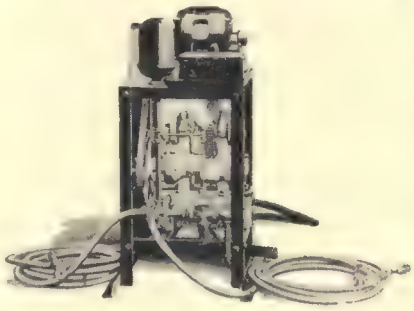
caked grease and crusted dirt. By a slight turn of the valve on the special U. S. pistol grip gun a soft, penetrating mist can be obtained for soaking and washing the body. A feature of these units is the fact that they can be connected directly to the city water supply line for both hot and cold water without danger of the high pressure backing up into the plumbing system and causing damage. This is made possible by a vacuum breaker valve supplied with the equipment. A double suction connection permits drawing a soap solution from a barrel or tank if desired. The pump of this machine is totally inclosed and all moving parts are continually bathed in oil.

## Two-Gun Auto Washer

MANLEY MANUFACTURING COMPANY
York, Pa.

IN BUILDING the machine shown the Worthington Triplex pump was selected as most suitable. This pump has three cylinders 120 deg. apart on the crankshaft so the flow of water is continuous with a maximum pressure. The pump has a single casting and no cup washers or leather buckets are used. The valves are bronze, wing guided in a vertical position on bronze seats. The crankshaft of the pump is drop forged, having babbitt connecting rods with cap screw connections for taking up the wear. The pump is driven by a silent chain from the motor on the top of the steel framework. Suitable sheet steel guards over the chain and gear protect them from water.

The unit is vertical with the motor at the top, so that it occupies small floor space. The reduction gear is of

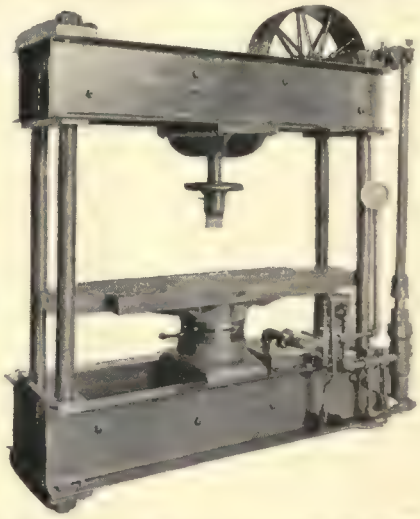


extremely wide face, coarse pitch and machined cut teeth. A feature is an automatic control valve furnished with the machine. It unloads the pump as soon as the system is up to pressure. This adds life to the pump and reduces the energy consumption. If for any reason the machine is overloaded, the safety valve discharges the water and relieves the machine of strain. The suction line contains a three-way valve so that city water can be pumped, or when thrown in another position the suction hose can be used in connection with a barrel of soap solution, etc. Automatic ring oilers are used on the motor, whereas all other parts of the pump are lubricated by the alemite system. The guns can be adjusted from a fine mist to a hard stream of any volume. The height over all is 46 in. The floor space occupied is 24x30 in. The size of the water fitting is ¾ in. The washer is furnished complete with triplex pump, safety guards, silent chain drive, 6 ft. of suction hose, two 25-ft. lengths of pressure hose, two guns, automatic pressure control, pressure gage and motor.

## Hydraulic Straightening Press

LOURIE MANUFACTURING COMPANY
Springfield, Ill.

STRUCTURAL steel construction is used in this press for straightening such parts as automobile axles, crankshafts and camshafts. It is furnished with one differential piston pump, which gives a rapid movement of the ram

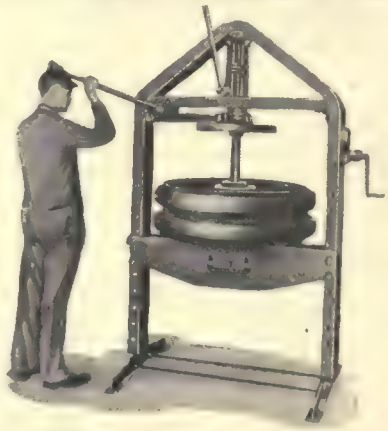


under low pressure and automatically slows down under heavy pressure. One additional piston can be furnished if desired which will give double the ram speed. It is operated by pedal control valve, which permits the operator to have free use of both hands. The machine shown occupies a floor space of 16 in. x 60 in.

## 60-Ton High-Speed Press

WEAVER MANUFACTURING COMPANY
Springfield, Ill.

MORE powerful, quicker and more easily operated, and said to be capable of handling any job, is this 60-ton press. The ball-bearing construction, combined with the steep pitch screw, insures greater power and speed with less effort. These are considered outstanding features. It affords two distinct leverages for light or heavy work, either of which can be used without changing the position of the work. Three leverages are available for heavy



pressure. The safety bolster is easily raised or lowered by a crank to bring the work in direct contact with the screw. Vertical operation of the lever makes it unnecessary to bolt the press to the floor.

# Association News & Discussions

## Motor Coach Maintenance*

**Proper Layout for the Garage Is Important to Obtain Greatest Efficiency from Shop Forces—Tool Equipment Need Not Be Elaborate but Should Be Chosen to Meet Requirements**

By H. P. McDonald
Superintendent of Automotive Equipment
East St. Louis & Suburban Railway, East St. Louis, Ill.

How large should an operator build his garage? Based on experience, the width should be not less than 100 ft. and the length, of course, would depend on the present size of the fleet and the probable future purchases of additional coaches. In using a minimum width of 100 ft., I am going on the basis that the garage, when built, will have no obstructions, such as columns or posts. This width permits coaches to be backed in along each side wall so as to leave an aisle in the center. Any particular coach can then be pulled out without having to move four or five other coaches. When the fleet is so large that center aisle storage becomes necessary, the 100-ft. minimum width still permits the greatest economic use of space. Coaches that are first out in the morning should be the ones stored in the aisles. In storing coaches along the side walls, the distance between coaches should be not less than 12 in., with 2-ft. wall clearance at the rear. This space provides proper access to night men to grease and clean the vehicles properly.

The last two items are very essential because a sanitary and clean coach attracts passengers and the ultimate achievement of low operating cost cannot be secured unless there is proper lubrication. The spacing also provides ample room for extinguishing possible fires.

In these days of rapidly changing conditions, a ceiling or truss height of 16 ft. should be a minimum. This gives plenty of ventilation and also provides for possible future purchase of double-deck equipment. Low-cost constructed garages are dangerous, as carbon monoxide gas causes men working on coaches to develop serious headaches.

### Wash Rack Location Important

The wash rack should be located just inside the main entrance door, its length depending upon the size of the fleet. The gas and oil pumps should be located at the inner end of this rack. This enables the largest part of the night's program to be completed at this point and all operations can be observed closely. Coaches coming in off their runs go over the wash rack for cleaning, then are filled with gas, oil and water, and, if not due for any inspection, would be immediately stored along the sides. If due for inspection, they would take their turn in going over the pits. Alongside the wash rack small pits should be provided in the floor, in which water hose and nozzles can be kept ready for use. The number of inspection pits depends upon the mileage of fleet over a 30-day period and the mileage basis adopted for periodical inspection. The tool room, stock room, and work benches should be located as near the pits as practicable, in order to save time in obtaining supplies. Plenty of room should be left between the work benches and the edges of the pits so that floor cranes for handling engines and other heavy apparatus can be readily used.

Motor coaches of today are being built lower and lower and there may be some possibility of making them still lower. Pits, therefore, are a necessity to speed up the work that has to be done underneath a motor coach. They enable the men to use their full efforts in the maintenance of the coaches. The pits should be well lighted and ventilated and should have a sewer connection so that they can be washed out occasionally and kept in a sanitary condition. The size of the pits will vary with the size of the vehicle, but their length should be such that any unit on the chassis can be inspected and serviced readily. Ample general illumination by means of ceiling lights should be provided, and there should also be frequent drop or portable light wall connection sockets. Of the latter at least two should be on each side of each pit and they should also be located not more than 20 ft. apart along all sides of the garage.

There are several methods of heating garages. Based on experience, it appears the use of radiators along the walls is the best. This enables you, in cold weather, to head your coaches in toward the wall so that the engines are close to the radiators and thus kept warm. This makes starting easier, keeps the oil at proper temperature and enables it to function when the engine is started, thus ultimately reducing maintenance costs.

### Training of Drivers

In order to have low maintenance cost, drivers must be properly instructed and trained. They must first be impressed with the fact that motor coaches are to be operated primarily for the comfort and convenience of the passengers. They should be started easily and smoothly and stops should be made in the same manner. While this provides comfort and convenience to passengers, it also, in the end, results in lower maintenance cost and less abuse of equipment. Drivers should be instructed to check oil and gas on leaving the garage and to make two or three checks during their day's run and, when they are relieved on the road, the relief crew should be instructed to do the same. This prevents running out of gas on the road, which may cause loss of patronage, due to irritation of passengers, and also prevents oil getting low, which may completely ruin a motor in a short time.

Drivers should also be impressed with the importance of reporting any and all unfamiliar noises which may develop during a day's run, and where obvious defects occur they should be required to report them on proper forms when they turn in to the maintenance department. We quite often find defective motor coaches sent out on the road just because drivers have failed to make the necessary reports so that the mechanical department can make repairs. Proper operation of motor coaches with low maintenance cost is just as much the business of the transportation department as it is of the mechanical department, and unless

*Abstract of paper presented at the Illinois Electric Railway Association convention, Springfield, Ill., March 17-18.

### COMING MEETINGS OF *Electric Railway and Allied Associations*

*March 24*—New England Street Railway Club, annual meeting and banquet, Copley-Plaza Hotel, Boston, Mass.

*April 1*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

*April 26-29*—Southwestern Public Service Association, convention, New Orleans, La.

*May 31—June 1-2*—Canadian Electric Railway Association, annual convention, Winnipeg, Man.

*June 6-8*—American Association of Engineers, annual convention, Tulsa, Okla.

*June 24-25*—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

*July 27-29*—Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.

*Oct. 3-7*—American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio.

there is close co-operation between these departments proper maintenance with consequent increase in reliability cannot be secured.

### Good Lubrication Essential

Maintenance on high-class automotive equipment can be conservatively stated to consist of 90 per cent lubrication and 10 per cent adjustment and replacement. If the lubrication is neglected the necessity for adjustments and replacement will increase all out of proportion to the lack of proper lubrication because, taking into account the quantities used, the highest priced lubrication is vastly cheaper than labor and repair parts. When the maintenance department realizes that the cost of lubrication represents a very small percentage of the total operating cost, the reliability of the coaches under their charge will increase and the cost of maintenance decrease.

Only the highest grade of lubricants should be used. In my opinion, there is no standard by which it may be gaged by laymen. Buying automotive oil on specifications doesn't mean anything, as we find several oils have the same flash, fire, viscosity and specific gravity tests and yet they may have different lubricating qualities. Therefore, the safest plan is to buy your oil from a reliable firm with an excellent standing in the industry and, within reason, accept the recommendation of that firm as to the grade and type of lubricant best suited to your needs.

General overhauling instruction sheets should be supplied so as to give the men a definite list of the work to be done. In our case printed instructions are placed on the left side and all gas and oil averages next to them; then the list of the mechanical defects that are reported from one inspection to another shows which of the various units on the coach have given the most trouble and need special attention. The record of gas and oil averages show readily the condition of the engine. The operator should analyze defects carefully that come up and if a particular type of defect recurs, he should notify the manufacturer so that a remedy can be found and applied in future production. In this manner all future purchasers of the particular type of coach equipment are benefited.

The printed instructions on the general overhaul sheets should be divided into different classes of work and in this way it is possible to develop the ordinary type of man into a valuable worker. Men can be developed from the ranks and promotion made from one grade to another, as performing these various operations day by day develops where an operator has an assortment of equipment. These instructions should be made to cover operations on all makes of coaches. Training of mechanics to do efficient work is a serious problem and the cost is great. Care should be used in selecting these men so that the turnover will be at a minimum.

Electrical work should not be tampered with by the ordinary mechanic. An automotive electrician should be the only man to look after electrical units, with the exception, of course, of changing lamp bulbs or changing an entire generator or magneto unit.

Provision of sufficient tools, blocks, jacks, etc., and satisfactory working conditions should be given careful consideration. In our case, we personally give shop men ten minutes in the morning at 10 o'clock and in the afternoon at 3 o'clock in the hot summer months for a smoke and recess. Of course, any smoking done around the garage is done on the outside and not inside the building. We feel that by doing this, it freshens up the men and causes a friendlier feeling toward the company and the departmental head in charge. Lockers, ample washroom facilities and a place for the men to eat their lunches should be provided.

### Few Machine Tools Needed

Men engaged in general overhaul operation do not require many machine tools, as the system does not call for actual repair of the units. It mainly consists of complete lubrication, complete adjustments and replacements of such units as are necessary. A drill press, bench grinder and arbor press are about all that are needed, and these only in emergency cases. We do not approve of furnishing mechanics with ordinary tools, such as wrenches, pliers, hammers and screw drivers as our experience has been that they are careless with company tools and let them lie around so that when they do need them they have to spend time to find the particular tool or wrench they want. If each mechanic is required to furnish his own tools of this character, he will not, as a rule, let them lie around and lose them. Large tools and other necessary shop tools should be furnished by the company and passed out on a check system, which makes the man taking it out responsible. Ample spare units should be kept on hand to speed up general overhauling work, so that the coach will not be tied up for a considerable length of time in order that the unit may be repaired.

Units which have been removed under general overhaul operations should be repaired in a special department, which gives better efficiency and enables the man in charge to hold the men working on those units responsible for improper repairs. Each unit should be numbered and a change slip made out when a unit is changed. A record should be kept of change slips and the reasons for such changes, so that when a particular defect shows up continually the cause of the defect can be analyzed and remedied. Except in emergencies temporary repairs should be avoided, as these are merely a makeshift and are apt to cause trouble and expense later. All major repairs should be made by the day force, leaving for the night force the running defects that are written up by the coach drivers on report cards. The latter usually consists of inspecting fan belts, setting up spark plugs, and checking up on brakes, etc. If the small defects are handled thoroughly at night, it will be found that road calls and involuntary stops will be materially decreased, as experience shows that road calls in general can be divided approximately 90 per cent to neglect, 5 per cent for flat tires and 5 per cent for defective materials and causes beyond control.

The success of motor coach operation depends on the thoroughness of the general overhaul or inspection, which must be done thoroughly in order to keep the vehicle at as near 100 per cent condition as is practical at all times. General overhauls or inspections should be carried out at such periods of from, say, 2,500 to 4,000 miles, in order to give satisfaction. In our opinion, 3,000 miles is the proper figure. If some program, such as the above, is not carried out, it will cause delays on the road, with consequent disruption of schedules and cause the public to lose confidence and stop riding, so that it may take months to get them back as customers. The man in charge of maintenance is held responsible for the mechanical condition of the coaches and if the transportation department does not allow him to keep the coaches over pits long enough to give them full inspection, best results cannot be secured. It must be remembered that a motor coach of proved merit costs from $8,000 to $12,000, and if it is not properly maintained its life will be short and the owner suffer a loss.

# American Association News

## Subjects and Meetings

MEMBERSHIP of the committee on subjects and meetings of the American Association has just been announced by President Sawyer. The complete personnel follows:

Harry L. Brown, secretary Ohio Brass Company, Mansfield, Ohio, chairman.

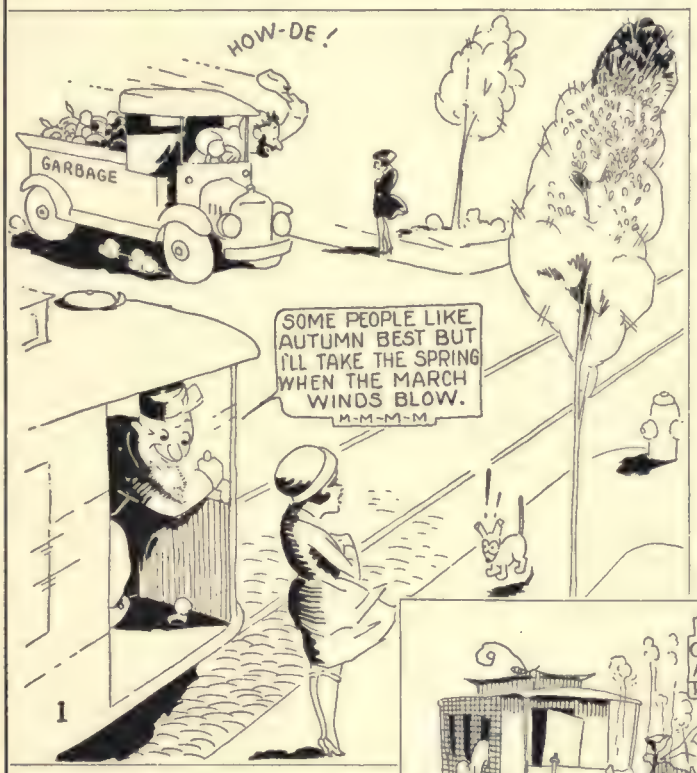
Edward Dana, general manager Boston Elevated Railway, Boston, Mass., vice-chairman.

James P. Barnes, Louisville, Ky.
F. G. Buffe, Kansas City, Mo.
F. L. Butler, Atlanta, Ga.
H. C. Clark, Newark, N. J.
Thomas Conway, Jr., Philadelphia, Pa.
L. J. DeLamarter, Grand Rapids, Mich.
F. W. Doolittle, New York, N. Y.
W. A. Draper, Cincinnati, Ohio.
R. W. Emerson, Cleveland, Ohio.
Thomas Fitzgerald, Pittsburgh, Pa.
J. R. Fitzpatrick, Chicago, Ill.
George Frey, Philadelphia, Pa.
Charles Gordon, New York, N. Y.
D. W. Harvey, Toronto, Ont., Canada.
W. W. Holden, San Antonio, Tex.
M. B. Lambert, New York, N. Y.
W. H. Lines, Portland, Ore.
E. B. Meissner, St. Louis, Mo.
Dudley Montgomery, Madison, Wis.
C. E. Morgan, Brooklyn, N. Y.
A. T. Perkins, St. Louis, Mo.
J. S. Pevear, Birmingham, Ala.
H. B. Potter, Baltimore, Md.
J. K. Punderford, New Haven, Conn.
G. A. Richardson, Chicago, Ill.
H. S. Robertson, Denver, Col.
E. J. Speh, Cleveland, Ohio.
E. P. Waller, Schenectady, N. Y.
E. A. West, Salt Lake City, Utah.
H. R. Whitney, Worcester, Mass.

# *Adventures of* Old Man Trouble

## *on the* Hicksville Railway

*Watching the "Scenery" Instead of the Traffic Causes Accidents*



Accidents are avoided by assuming that the other fellow is going to be careless. Keep your eyes and mind on the traffic. The greatest asset a street railway has is an employee who guards the safety of those intrusted to his care and lets the "scenery" go by without distracting his attention from essential duties.

ELECTRIC RAILWAY JOURNAL will be glad to furnish press proofs of this page free of charge for posting on bulletin boards and will supply electrotypes of this series at cost for use in company publications.

J. M. ZIMMERMAN AND E. L. PROCTOR

# The News of the Industry

## One-Man Car Case Decided

**Iowa Supreme Court Refuses to Enjoin Union from Enforcing Two-Man Car Requirement.**

All hope of instituting one-man car service as an economy measure by the Des Moines City Railway, Des Moines, Iowa, appears to have been banished in an opinion handed down on March 15 by the Iowa Supreme Court affirming Judge Joseph Meyer of the Polk County District Court and refusing to enjoin Local 441 of the Amalgamated Association from enforcing a 25-year contract calling for the operation of street cars by a motorman and a conductor.

### COURT QUOTES WORDING OF THE 1916 FRANCHISE

The high court failed to rule directly upon the contention of the company that the contract was against public policy in that it prevented the introduction of economies which would, if instituted, result in the reduction of fares to the residents of Des Moines. The court disposed of this question by pointing out that the franchise ordinance of 1916 contains the provision that "in the operation of its railway by electricity each motor passenger car shall be in control of a motorman and a conductor."

This is practically the wording of the contract between the company and the association, the opinion states, and goes on to say that, "so long as this ordinance of the city of Des Moines exists all parties are bound thereby, and there is no ground for equitable intervention."

In a similar manner the court refused to assume jurisdiction in the question raised by the company over the validity of the check-off. The opinion says:

> The company has a clear, speedy and adequate remedy at law for the very thing about which it complains. It is true that the evidence shows that certain of the employees did so notify the company (to refuse to pay the check-off of officers of local 441), but such employees are not specifically named as defendants herein.

On the third main point raised by the company, which alleged that the contract was "invalid because it was in violation of the constitution and by-laws of the International Association," the court held that this was a matter wholly between the local and the international. On this point the ruling said:

> So long as no complaint is being made by the international against the local for non-compliance, it does not lie with third parties to raise such a question.

### MATTER OF PUBLIC POLICY DISCUSSED

The company's charge that the contract has the effect of unionizing an entire industry and is therefore against public policy brought forth the comment from the court that "if it is true that the contract contravenes public policy, as between the parties thereto, both are *part delecto*, or, in other words, both are equally at fault."

The contract which the traction company sought to enjoin the union from enforcing was signed in 1915 and has thirteen years to run. The company has been operating under a 10-cent cash fare and selling weekly passes at $1.25, but has shown monthly deficits regularly for nearly a year with the exception of December, 1926, and January, 1927. The debit to the stabilizing fund as of Jan. 31 this year was $24,243. F. C. Chambers, president of the company, estimated that the institution of one-man cars would have meant a saving of more than $200,000 annually and a reduction of fares under the present service-at-cost franchise.

J. G. Gamble, attorney for the railway, announced that he will ask for a rehearing.

## Dr. A. A. Mitten Made Chairman of Philadelphia Committee

Thomas E. Mitten, for sixteen years chairman of the executive committee of the Philadelphia Rapid Transit Com-Company, Philadelphia, Pa., relinquished his post on March 16 in favor of his son, Dr. A. A. Mitten. The elder Mitten will continue as chairman of the board of directors, but will shift much of the burden of active management to the son, it is understood.

Coleman J. Joyce, counsel, and Leon Jewell, vice-president in charge of traffic, resigned from the board of directors. They were succeeded by J. A. Queeney and Ralph T. Senter, respectively.

## Terminable Permit Legislation in Illinois Unlikely

The long-delayed report on terminable permits for public utilities in Illinois has been presented to the state Senate by Senator Richard J. Barr, chairman of the joint commission which spent two years studying the subject.

The recommendation of the commission urges the adoption of terminable permits as the franchise scheme in the state. It does not suggest what agency shall issue the permit, nor the terms, nor under what conditions a permit shall be terminated. The recommendation does not go farther than urge that the terminable permit method be adopted.

The failure of the House and Senate to present a report in a formal way is said to have injured the chances of any terminable permit legislation at this session. Senate and House members predict that no act will pass the present session of the General Assembly. The recommendations contained in the report were reviewed in the ELECTRIC RAILWAY JOURNAL for Jan. 8, page 92.

## Amends Fare Petition

**New Plan Advanced by Pacific Electric Includes Reduction in One-Way and Round-Trip Fares**

A supplemental application to its recent request for a hearing on the petition for a general increase in fares has been forwarded by the Pacific Electric Railway, Los Angeles, Cal., to the California Railroad Commission. The new application asks for an entirely new set of fares to be established temporarily on certain lines. The plan contemplates a material reduction in one-way and round-trip fares, but an increase in the present form of daily commutation tickets. It is proposed to provide only one form of commutation ticket, namely, the 30-ride family ticket with a limit of 90 days from the date of sale, which will be at a lower rate than the cost of the same ticket at the present time, yet will be higher than the present daily commutation ticket. In the new schedule of fares contained in the supplemental application only one-way fares and 30-ride commutation ticket fares are provided. The round trip will be double the one-way fare. According to the supplemental application these are to be tried out during the investigation by the Railroad Commission with the understanding that if a trial of these fares for a reasonable length of time proves that they are unsuccessful in materially increasing traffic volume, the company has permission to restore the present fares without delay.

The original application for a general fare increase asked to advance the fares 14 per cent over the present rate. At the present time the Pacific Electric is operating two distinct classes of services, a local and city service and an interurban service. The proposed set-up contemplates three classes of fares and service—the local or city service as it is at present; a scale of fares for suburban service extending to surrounding points of metropolitan district, and the interurban service to more distant points.

In commenting upon the new application, D. W. Pontius, vice-president and general manager, said that the purpose of the original application for an approximate average increase of 14 per cent was to provide sufficient additional revenue to meet operating expenses and fixed charges. As set forth he claimed these had been far below a reasonable return on the investment. He said that residents in communities near Los Angeles and chambers of commerce there had expressed the belief that a reduction instead of an increase in the one-way and round-trip fares would produce a material increase in travel volume and a like increase in revenue because of such volume. It was his contention that

operating results had been so discouraging that the company was willing to experiment with the lower fares for a reasonable length of time, although it might lose in revenue, but with a view to the possibility of working some plan in the way of increased fares that would be of benefit not only to the railway but to the community served.

## Jersey Legislature Passes Paving Bill

The New Jersey Assembly passed on March 15 the bill introduced by Senator Abell of Morris County to relieve electric railways of a part of their street paving obligations. The vote was 36 to 20. Governor Moore is expected to veto the measure.

The Board of Freeholders at Newark, N. J., has taken its fight against the electric railway paving bill direct to the people in paid advertisements in newspapers, a step which is believed to be without known precedent.

The Freeholders analyze the paving bill, present their arguments against it and wind up by repeating that a nonpartisan commission should be appointed to study the paving problem. They say in part:

> The Board of Freeholders of the County of Essex, in the interest of taxpayers, has consistently opposed for several years the repeated efforts of the traction interests to get from under their obligations in this manner, and the board has been continuously aided in its efforts by the State Association of Freeholders, the State League of Municipalities and representative civic bodies.
>
> The Board of Freeholders and these bodies have always advocated the study of the franchise, contractual and other financial relations between traction companies and municipalities and counties before any such sweeping legislation is enacted. We have requested our representatives in the present legislation to propose and further in the Legislature the creation of an impartial commission for the purpose of such study.

Each section of the measure is numbered and discussed by the Freeholders in an adjoining column in the "ad" itself. Traction company "sales talk" is the way the first section is described.

## Henry L. Doherty Out of Routine Work

Henry L. Doherty, president of the Cities Service Company, New York, has addressed a letter to stockholders of his companies describing the condition of his health and announcing that he never expects again "to take an active part in the routine work" of the business.

He insisted that his organization had been so perfected that it would function perfectly without him. He intimated that on account of his health it had become necessary for him virtually to retire from active business and said that he was "still unable to conduct business in the ordinary way." Among other things he said:

> At all times my business affairs have been provided for by will and by provision for trustees. If anything should happen to me now, or at any other time, there is no reason why it should lessen the intrinsic value of the securities of the Cities Service Company by a single dollar. I have taken no part in the routine work of the Cities Service Company since the United States got into the World War, and never expect again to take an active part in the routine.

## Wage Demands in New York State

Employees of the New York State Railways are drafting their demands for a wage increase and other concessions in their yearly agreement. The old agreement expires on May 1. While no formal demands have yet been presented to the railway, union officials make no secret of the fact that the men in Utica, Rochester and Syracuse will ask an increase in wages of 10 cents an hour, placing of two-man and one-man car operators on the same scale and a six-day week.

The present wage scale is 60 cents an hour for operators of one-man cars; 55 cents an hour for two-man car operators and 57 cents for interurban employees. The 10-cent increase has been filed in every proposal of the union since 1923. It is expected that 70 cents an hour flat scale for one-man and two-man car operators will be asked.

The union leaders base their plea for a pay increase on the fact that fares have been raised in all three cities, although very recently in Utica and Syracuse. Fares in Rochester were raised to 8 cents in January, 1925. Officials of the railway point to the increased costs of operation and the short tenure of the fare boost.

All proposals are submitted to joint vote of the workers in the three up-state cities. While the contract expires on May 1, any agreement reached after that date becomes retroactive. The contract provides for arbitration and there is a joint conference board made up of the presidents and business agents of the divisions of the Amalgamated Association in the three cities.

## Disqualification Proceedings in Seattle

The United States Circuit Court of Appeals in San Francisco has denied a petition of John G. Von Herberg, a taxpayer of Seattle, Wash., to disqualify United States Judge E. E. Cushman from hearing a taxation action involving the city of Seattle and the Puget Sound Power & Light Company. Mr. Von Herberg has filed in the trial court an affidavit of prejudice and bias on the part of Judge Cushman. Judge Cushman certified to the Circuit Court the fact that such affidavit had been filed. In his petition to the Circuit Court Mr. Von Herberg, through counsel, contended that Judge Cushman in so certifying had automatically disqualified himself, and asked for an order selecting another judge. The court held that it lacked jurisdiction.

The Circuit Court of Appeals also has under advisement the matter of disqualification of Federal Judge Jeremiah Neterer in the Seattle Municipal Street Railway litigation and also a motion by J. Ambler Newton, assistant corporation counsel in Seattle, to dismiss all actions pending in federal court against the Washington municipality in the railway litigation. Attorneys for the Puget Sound Power & Light Company appeared before the court and argued to have Judge Neterer disqualified on the grounds that he is a Seattle taxpayer and therefore would be prejudiced.

Attorneys for the city of Seattle declared that the city is not a party to any disqualification proceedings and urged that the higher court dismiss the litigation.

## Home Rule Referendum at Chicago's Mayoralty Election

Managers of the local Democratic organization have succeeded in collecting approximately 260,000 signatures on a petition for a referendum on the question of whether Chicago shall come from under the state public utilities act and restore to the city substantial control over its public utilities.

By virtue of the filing of this petition with the county election board on March 6 the question is automatically placed on the ballot at the Mayoralty election April 5. A minimum of 184,000 names was required by state law in order to submit the proposition to the voters. If the referendum is passed at that time, control of all local utilities will be taken from the hands of the Illinois Commerce Commission and vested either directly in the Chicago City Council or in a local commission created by the Council. This would take place as soon as the city clerk formally notifies the state commission of the outcome of the vote.

Under the state public utilities act, which created the Illinois Commerce Commission, it is provided that any city desiring to withdraw from the rule of the commission and set up one of its own selection may do so by agreement of a majority of the voters at a Mayoralty election. The acts of a city commission are, however, subject to review on appeal by the state commission. There is now pending before the Legislature, however, an amendment known as the McCluggage bill, which would bring appeals directly to the courts.

## East St. Louis Goes to Church

The "return pass" system to increase Sunday traffic on its street cars and bus lines has been temporarily adopted by the East St. Louis & Suburban Railway. Residents of East St. Louis, Belleville and Alton, Ill., will have an opportunity to use the plan during all of the Sundays of the Lenten season. The special plan became effective on Sunday, March 6, and on the first day 380 persons availed themselves of the reduced rate and much publicity for the railway was won. The passes, at first good only between the hours of 5 a.m. and 1 p.m., are now effective between 4 a.m. and 1 p.m. and between 6 p.m. and 10 p.m.

The cut rate was advertised by the company as a special inducement to residents along its lines to "go to church." Advertising cards have been placed in all of the street cars and buses operated by the company advising the patrons to take advantage of the reduced rates and "Go to Church During Lent." Under the pass system a passenger pays 10 cents and receives a coupon valued at 10 cents when applied toward the cost of the return trip. Residents of Belleville who wish to attend church services in East St. Louis can save 10 cents on the round trip.

## New Fare Schedule on Massachusetts Interurban

An increased schedule of fares for the occasional rider went into effect on the Boston & Worcester Street Railway, Framingham, Mass., on Feb. 15. Zone tickets are still sold at 66 for $2.50 and there has been no change in the zones. The fare on the Marlboro cross-town line has been increased from 5 to 6 cents. The former basis of fare for the occasional rider was 10 cents for any two continuous fare sections and 5 cents for each additional fare section. The new basis is 10 cents within one fare section, or 6 cents a fare section. An exception is made on buses operating between Park Square, Boston, and Salem Square, Worcester, by way of Watertown and other places.

The former rate for pupils' tickets has been increased from eighteen zone coupons for 45 cents to twenty tickets for 60 cents. The old schedule of round-trip tickets from Chestnut Hill to Natick and thence to Worcester remains unchanged. The provision that each fare section is approximately 1⅜ miles is left out of the new schedule. A tariff rate for special buses filed with the State Department of Public Utilities is 50 cents a mile from point of origin to point of destination plus 30 cents a mile for dead mileage, plus operator's hourly rate for all time held.

## Operation of Rochester Subway Railroad Urged

All indications point to operation of the municipally owned subway railroad in the bed of the abandoned Erie Canal in Rochester, N. Y., by the New York State Railways, Rochester lines. At a public hearing no serious opposition to leasing the line to the railways for a three-year trial operation was voiced. Previously Mayor O'Neil had intimated he was considering municipal operation if there were enough public and official sentiment for it.

Members of the Mayor's official family and of the city municipal research bureau, however, have gone on record as being in favor of turning the operation of the railroad over to the transportation company, which is the only agency with the equipment, experience and men to take it over at once. The Mayor has arranged conferences with city and transportation officials, from which is expected to evolve a new contract for operation by the railways under service at cost. Pressure of business interests will, it is believed, force early action by the municipal authorities. The line is nearly completed, the cost to the city has been heavy and leading industries and business houses are demanding that a plan of operation be speedily worked out.

## New Articulated Cars Between Baltimore and Washington

The new Pullman type cars to be placed in operation by the Washington, Baltimore & Annapolis Railroad were inspected officially on March 11. Utility commissioners and operators from Cleveland, Washington and Baltimore asserted that the luxury of the new cars constituted an effective reply by interurban electric lines to the rapidly increasing competition of buses. The first of the two-car units to reach Baltimore was run over the line from Washington to Baltimore.

J. J. Doyle, president of the Washington, Baltimore & Annapolis, was in charge of the inspection party. Visitors present were J. H. Alexander, president; Charles H. Clark, maintenance engineer; Terence Scullen, master mechanic, and Paul E. Wilson, vice-president, all of the Cleveland Railway; Samuel Bole, engineer of the J. G. Brill Company; H. B. Potter, general manager; S. E. Emmons, assistant to the president, and Adrian Hughes, United Railways, Baltimore, and A. S. Wentworth, Westinghouse Electric & Manufacturing Company.

Six new units are now being placed in operation. The four others will be delivered the latter part of this month. Mr. Doyle has said that the early test trips were very satisfactory. He believes that the improvements in riding quality and in comfort attained by the articulated effect, the luxurious revolving seats and the other fine appointments are going to answer satisfactorily the demand for luxury on the part of the high-grade clientele.

First of Ten High-Speed Articulated Cars to Be Delivered to the Washington, Baltimore & Annapolis from the Philadelphia Plant of the J. G. Brill Company

## February Safety Banner in Rochester Awarded

The safety banner for February on the lines of the New York State Railways, Rochester lines, went to the Main Street East division, which operated 8,932 miles per accident; second in line was the Portland division with a record of 6,713 miles per accident. Reports showed that the one-man cars operated more miles with fewer accidents than the two-man trolleys. This competition is part of the campaign under Safety Director Leon R. Brown.

## Improvements on Skokie Valley Route in Effect

Operation of all except two through trains between Chicago and Milwaukee over the new Skokie Valley route, installation of a new fast service between downtown Waukegan and the Chicago Loop over the Skokie Valley line and the addition of several more stops made by certain limited trains were simultaneously effected by the Chicago, North Shore & Milwaukee Railroad on Feb. 20. The new schedule of operation over the Skokie Valley route centralizes all high-speed operations on this new stretch of private right-of-way. The new station stops scheduled for several of the Chicago-Milwaukee limiteds are North Chicago, Waukegan, Zion, Kenosha and Racine.

## Phoenix Voters Will Pass on Rehabilitation Plan

April 30 has been set by the City Commission as the date for special election on the proposed $750,000 bond issue for the complete rehabilitation of the Phoenix Street Railway, Phoenix, Ariz. Mayor Frank E. Jefferson asked if it might not be feasible to submit also an alternate proposition to the voters on April 30 to provide for rehabilitation of only certain portions of the railway system at less cost. It was pointed out by City Attorney W. L. Barnum that the dominating issue was to determine whether the city was within its constitutional rights in incurring indebtedness for the rehabilitation of the system.

## "Zero Hours" in Atlanta

During the month of February, 24 "zero hours" were posted for the trainmen of the Georgia Power Company, Atlanta, Ga., in which time only one accident occurred traceable to the negligence of a street railway employee. The "zero hour" idea was originated by W. J. Rountree, safety director for the company. Every day one hour is taken as "zero hour." The hour so chosen each day is posted on all of the transfer boxes of the company, and during that hour every precaution is taken by motormen and conductors to keep a clean record. The psychological effect of the "zero hour" has been to show train crews how easily accidents can be prevented if only a little thought and care are employed. Later it is planned to extend the "zero" period for a complete "zero" day.

## Rate Increase Sought by Gary Railways

That earnings have never been sufficient properly to support service on the Gary and Valparaiso division was given as the reason for a proposal to increase certain commutation rates between Gary and Valparaiso filed on March 8 with the Indiana Public Service Commission by the Gary Railways.

Commutation rates between Gary and Valparaiso on the company's Valparaiso division are now considerably less than the lowest commutation rate offered by the Pennsylvania Railroad, the only competing line, the petition states. The proposed increase in fare will enable the railway, which operates cars directly to the various mills in Gary, to continue the present schedule between the two communities and to provide better service for the many Gary mill workers residing in Valparaiso, it is pointed out.

The company asks permission to cancel the present 25-ride commutation ticket, which is good for transportation between Valparaiso and any point within the first fare zone in Gary and sells for $7.50, and to issue a ten-ride bearer coupon ticket at the rate of $4. Should the authority be granted by the commission, the new rate will go into effect 30 days after the issuance of the enabling order.

In support of the company's application, the petition points to an extensive program of rehabilitation begun last year to make the Gary-Valparaiso division one of the most efficient interurban lines in the company's system.

## Contract for New East River Line Approved

The Board of Estimate of New York City in committee of the whole has voted unanimously to approve the contract for the construction of the tunnel under the East River from the foot of East 53d Street, Manhattan, to Nott Avenue, Long Island City. Formal award of the contract to Patrick McGovern, Inc., for the bid price of $10,631,550 is expected to follow.

The board's action was taken on the recommendation of John H. Delaney, chairman of the Board of Transportation. Mr. Delaney denied the contention of opponents of the construction of the 53d Street subway that the tunnel was unnecessary. One particularly significant remark of his was that unification of the city's rapid transit lines was "inevitable." He did not indicate just how he expected this unification to be accomplished.

## Trolleys Over Camden Bridge Assured

The first steps in the running of railway cars over the Delaware Bridge was taken on March 10 when the Camden City Commission passed an ordinance giving the Public Service Corporation of New Jersey the right to lay loop tracks from the Camden bridge plaza to the center of Camden. Since that date the Philadelphia Rapid Transit Company has announced that it would join with the Public Service Corporation of New Jersey in an application to the Delaware River Bridge Commission for trolley operating privileges across the interstate span. Permission to build the loop was given to the Camden Horse Railway, an underlying concern of the Public Service Corporation. Under the plan thousands of people each day will be able to travel in the trolleys of the Philadelphia Rapid Transit over the bridge and then over the Public Service rails to Camden. Details are being worked out by engineers of both companies, which now are operators of a bus service across the bridge.

## News Notes

**Weekly Pass in Texarkana.** — The Southwestern Gas & Electric Company, Texarkana, Ark., is selling weekly passes on its lines for $1.

**High Honor for Motorman.**—Tal F. Harris, a motorman of the Nashville Railway & Light Company, Nashville, Tenn., was recently presented a handsome gold watch and made the subject of a citation before operators and officials of the company. Attention was directed to his ten years of operating without the semblance of an accident and to his equally notable record for courtesy. The watch presented to Mr. Harris bore an inscription signed by B. C. Edgar, president. It read: "Recognizing a distinguished safety and service record." His record shows approximately 320,000 miles run and 1,825,000 passengers carried.

**Amends Fare Request.** — The Colorado Springs & Interurban Railway, has asked the City Council of Colorado Springs, Col., to consider the retention of the present 10-cent fare, but abolish the two fares for 15 cents and instead accept tickets at six for 50 cents or fifteen for $1. The City Council had previously declined to approve the ticket-selling idea because it required the purchase of $1 in tokens.

**Excursion Trips Offered.**—The Union Traction Company of Indiana, Anderson, Ind., has started special excursions over its lines to various points of interest and the response thus far has been good. Each weekend the company offers special rates to certain points. Recently a trip to the Circus City zoölogical gardens, near Peru, was offered. Here the patrons can see one of the largest collections of wild animals in the country.

**New Demands in Scranton.**—Motormen and conductors of the Scranton Railway, Scranton, Pa., have prepared demands to be embodied in a new agreement replacing the old one which expires on April 1. They ask that the hourly rate be raised from 64 to 74 cents, while one-man operators, now receiving 72 cents, want 89 cents an hour. The men also want an eight-hour day on all runs with time-and-a-half pay on hour-over schedule runs. This stipulation is incorporated in the present working agreement, but the runs are said to vary in time from eight to 9½ hours. More than 600 motormen, conductors, brakemen and trackmen will be affected by whatever changes are made in the agreement.

**Would Change Method of Handling Freight.**—A change in the method of handling freight shipments on the Illinois Traction System at Champaign, Ill., has been announced with the completion of the "Champaign Belt," on which engineers of the Illinois Traction System have been engaged for about a year. The traction system has electrified approximately 5½ miles of the main lines of the Illinois Central and the Wabash Railroads at Champaign, and in future all freight transported by the Traction will go on the new belt line, hauled by electric locomotives.

**Mutual Track Arrangement to Improve Service.**—Residents of East Boston, Mass., have lost their fight to prevent the Eastern Massachusetts Street Railway from operating through cars over the lines of the Boston Elevated to Maverick station in order to improve the service to Revere. The public utilities department has issued an order providing for the through service, stipulating, however, that not more than six cars an hour shall be so operated. The department in its order referred to the contention of the trustees of both companies that this arrangement would effect a saving in operating expenses over that obtaining at the present time and would improve the service both for the people of Revere and the people of East Boston.

**Conductor Punished for Theft.**—Delbert Kraft, conductor on the Jackson lines of the Michigan Electric Railway, was sentenced on March 11 to serve from six months to five years in prison for pilfering fares. The court recommended that he serve six months. Conductor Kraft pleaded guilty and said he was driven to the theft by financial straits. Judge Benjamin Williams declared that he could not place Conductor Kraft on probation because there were 2,400 conductors in Michigan who might be tempted to take the funds of their companies if they thought that they could escape. The offender was not required, however, to pay any cost or fine or to refund any money to the company. He was $300 short in his returns.

**Employees Enter Contest.** — An essay contest for railway employees, arranged by W. J. Rountree, safety director for the Georgia Power Company, on the subject of "What Do We Owe the Passenger for His Fare?" resulted in the submission of approximately 100 essays of high quality. C. H. Strong, assistant to the manager of the railway department; B. K. Godfrey, manager of the compensation department, and L. K. Starr, publicity director for the Georgia Power Company, were judges. W. C. Alsobrooks, a conductor, was winner of the first prize, with C. H. Varn, a motorman, in second place and S. J. Steele, also a motorman, in third position. The first three essays are to be printed in full and distributed to the 1,500 trainmen in the railway department, as it is believed the essays, written by members of the crew, will go much further toward developing a spirit of courtesy among employees than any number of memos from headquarters.

# Recent Bus Developments

## Bus Activities in Springfield Planned

Sidney H. Sayles, superintendent of the Springfield Street Railway at Palmer, Mass., has announced that bus service will supersede railway service on the Three Rivers, Bondsville, Ware and Monson lines shortly after May 1. H. M. Flanders, general manager of the company, has applied to the Selectmen of the towns for the necessary licenses to operate buses. The railway was granted licenses to operate bus service in the territories mentioned one year ago and these licenses expire May 1. The Springfield company never attempted to make use of the privilege last year, but Mr. Flanders was assured that the licenses would be renewed. The company has also applied for licenses to operate buses between the Palmer-Wilbraham and the Palmer-Brimfield boundaries. The railway lines operating between Palmer and Worcester are to be abandoned. This will clear the way for a through line of buses between Springfield and Worcester. De luxe buses will be operated.

## High Point Awaits Bus Operation

A bus system to be placed in operation in High Point, N. C., some time this spring will mark the discontinuance of railway service. An agreement to this effect was reached by the City Council, officials of a bus company and officials of the North Carolina Public Service Company, the railway operator. The latter company waived its carrying rights in favor of the buses. The buses will be operated by the Carolina Transit Company, Columbia, but if they do not meet the needs of the city, the North Carolina Public Service Company has agreed to re-establish railway service.

Ten new buses are to be started, covering about three times as much territory and serving several times as many people as the street cars at the present time. One line will extend to High Point College and the other will go to the baseball park.

## Missouri Bus Bill Passes Senate

The Missouri Senate on March 9 by a vote of 25 to 5 passed Senator A. L. McCawley's bus control bill. It places all bus lines in the state outside of Kansas City under the jurisdiction of the Missouri Public Service Commission. The bill provides special taxes of from $60 to $1,000 per bus and limits the bus to not more than 25 ft. in length nor 84 in. in width. St. Louis buses will not have to pay the extra state tax, but will continue to give the city a percentage of their gross receipts for the use of its streets. The highways committee of the Missouri House of Representatives on March 8 voted to report favorably a bill placing control of bus lines using state highways and streets under the supervision of the Missouri Public Service Commission. The measure also provides for special license fees to be paid by the bus companies.

## Bus Subsidiary of West Chester Street Railway Reorganized

Reorganization of the Peoples Transportation Corporation, a suburban bus subsidiary of the West Chester Street Railway, West Chester, Pa., was effected on March 4. The two companies operate under the route name of "The Chester Valley Lines." During the proceedings, participated in by representatives of fifty creditors with aggregate liability accounts of $500,000, the following were elected officers to handle the affairs of the company: C. B. Cooke, Jr., Philadelphia, president; F. G. Wilson, Chicago, treasurer and general manager, and Eric H. Biddle, Philadelphia, secretary.

Under the plan of reorganization, sufficient security and credit were offered to offset the unsecured liabilities of $102,000, which represented indebtedness to local supply houses, in addition to the amount owed the Yellow Truck & Coach Manufacturing Company for buses. The assets of the company, exclusive of value of franchise rights, before the reorganization plan was effected were almost equal to the liabilities. Secured loans from the parent company total approximately $300,000, and liabilities of $250,000 included in creditors' statements have been offset by a like amount in equivalent values.

The Peoples Transportation Corporation operates 40 buses through the Chester and the Schuylkill Valleys. Its lines connect Reading, Pottstown, Norristown, West Chester, Chester and Wilmington, and Media and Oxford. The West Chester Street Railway owns all of the outstanding stock of the Peoples Transportation Corporation.

## More Plans Matured at Worcester

The Worcester Consolidated Street Railway, Worcester, Mass., has asked the Department of Public Utilities for permission to extend its June Street-Tatnuck bus line. The Consolidated plans a terminus at Dawson Road, a mile north of Tatnuck Square. At the start trips will be made at night, noon and morning to accommodate workers. The bus service in this section the company believes is desirable because of the growth of the neighborhood.

The company has started bus service between Worcester and Clinton, Mass., by way of Boylston. The Worcester terminal is the Union station and the Clinton terminal the railroad station in that town. The fare between the two places is 50 cents. The buses are express part of the way.

**Bus Brings Increase in Riding.**—The six months experiment in the substitution of bus service for city railway service at Manitowoc, Wis., by the Wisconsin Public Service Corporation has met with a certain measure of success. During December, 1926, there was an increase of 43.4 per cent in revenue passengers compared with December, 1925, when the railway cars were still in use. January, 1927, showed a further increase, with 46.1 per cent more passengers riding than in the similar month of 1926.

**Would Extend Bus Service.** — The Connecticut Company is planning further extension to its bus service and has applied to the Public Utilities Commission for permission to operate between Hartford and West Hartford, Conn., as an amendment to its present charter.

**Bus Bill Favors Portland Company.**—A bill to permit the Portland Railroad, Portland, Me., to operate buses as it may see fit has been passed by the Legislature. An attempt to amend the bill so as to prevent the railway from taking up any of its tracks or discontinuing operation of cars when bus operation is started was lost.

**Bus Line Now Serves Oklahoma City Addition.**—The Oklahoma Railway established a new bus line from the downtown section of Oklahoma City to the Crestwood addition in the northwest part of the city on March 1. Buses are being operated on a twenty-minute schedule. Several new buses of the latest design have been installed.

**Another Motor Coach Route in Pittsburgh.**—The Pittsburgh Motor Coach Company, Pittsburgh, Pa., has been granted a franchise to operate a fifth motor coach route beginning March 21 between Union Station and the intersection of Lebanon Boulevard and Washington Road in the high-grade South Hills suburbs. The distance is 7 miles and the expected running time 32 minutes. Limousine coaches each seating nineteen persons will be operated at intervals of twenty minutes off-peak and twelve minutes peak. As on the other routes of this company, the fare will be 25 cents.

**Oppose Bus Operation.**—Petitions of the Sandston Electric Railway for authority to abandon the 2½-mile stretch of tracks and to operate bus service between Richmond and Highland Springs, via Seven Pines and Sandston, have been dismissed without prejudice by the Virginia Corporation Commission, following a hearing at which considerable opposition was voiced to both petitions. The company is owned by the Richmond-Fairfield Railway, Richmond. The petitions were dismissed at the request of S. W. Zimmer, counsel for the railway, who said the opposition was "unexpected," and that he wished to consult with Oliver J. Sands, president of the railway and prominent Richmond bank president, now out of the city, before taking further steps. John Randolph Tucker, counsel for minority stockholders and for persons living along the line, explained that his clients feared that operation of a bus line would make the electric railway so unremunerative it might be abandoned.

# Financial and Corporate

## Day & Zimmermann Buy National Public Service

### With Their Associates Acquire Controlling Interest from A. E. Fitkin—Mr. Zimmermann to Be President

Day & Zimmermann, Philadelphia, and their associates have acquired from A. E. Fitkin the controlling interest in the National Public Service Corporation. Mr. Zimmermann will be president of the company and Floyd W. Woodcock will be vice-president. No change in the operating personnel of the company is contemplated, but the company will have the benefit of the long experience of Mr. Zimmermann and his organization in the public utility field. The National Public Service Corporation with gross receipts of more than $27,000,000 has been built up by Mr. Fitkin, who remains on the board. The gross receipts of the Day & Zimmermann properties prior to this addition were about $12,000,000.

The most important properties controlled by the company are situated in the states of New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, Georgia and Florida, and serve an aggregate population of more than 2,000,000.

The principal companies controlled by National Public Service Corporation include Jersey Central Power & Light Company, Virginia Public Service Company, Tidewater Power Company, Florida Power Corporation, Eastern Shore Gas & Electric Company and the Municipal Service Company.

Mr. Fitkin in confirming the sale stated that he is surrendering the control and supervision of the affairs of the company because of his desire to devote all of his time and attention to his western properties known as the Inland Power & Light Corporation system.

The trackage of the railway properties included in the National Public Service Corporation totals 356 miles. Statistics of these properties follow:

| | 1926 | 1925 |
|---|---|---|
| Transportation Department: | | |
| No. of car-miles | 12,206,733 | 12,218,198 |
| No. of bus-miles | 1,702,006 | 1,809,639 |
| Total vehicle-miles | 13,908,739 | 14,027,837 |
| Passengers carried: | | |
| Street railway | 80,609,958 | 82,221,883 |
| Bus | 3,982,043 | 3,568,171 |
| Communities served: | | |
| Street railway | 96 | 103 |
| Bus | 47 | 43 |
| Population served: | | |
| Street railway | 772,980 | 755,000 |
| Bus | 686,844 | 683,000 |

Of the total earnings of $27,788,680 the receipts from transportation were $5,761,704, or 20.7 per cent.

The Tidewater Power Company operates the electric railway in Wilmington, N. C., and surrounding territory. The Municipal Service Company operates an interurban railway in Ohio known as the Youngstown & Suburban, the railway properties in York and Oil City, Pa., and controls the Keystone Public Service Corporation, which in turn, through its subsidiaries, operates the electric railway and bus lines in and around Scranton and Altoona, Pa.

## Voters Disapprove Rainier Purchase

The Seattle & Rainier Valley Railway purchase was voted down in Seattle, Wash., by the people on March 8. The public showed by a large vote their disapproval of the purchase for $1,200,000 of the only privately owned car line remaining in the city.

## Would Purchase Railway Bonds

The Massachusetts State Department of Public Utilities has received a petition from the New York, New Haven & Hartford Railroad for permission to purchase $330,000 in bonds of the Springfield Street Railway, Springfield, Mass. It is explained that there are now outstanding an equal amount of bonds of the Springfield & Eastern Street Railway maturing on Jan. 1 next. These are held by the New Haven and in order to refund them the Springfield company is to issue new bonds. As the terms said to have been offered by the bankers for the bonds are said not to have been considered sufficiently liberal by the New Haven, that company desires to take the entire issue in exchange for the maturing bonds at 6 per cent paying par.

# 1,574,969,902 Ride Surface Lines

### Residue Receipts of $13,302,112 in Chicago Show an Increase of $1,144,438 or 9.41 Per Cent, the Highest Except 1922, the Year of an Eight-Cent Fare

THE fiscal year Feb. 1, 1926, to Jan. 31, 1927, covered by the report of the Chicago Surface Lines, although the last under the 1907 and 1913 ordinances, was the most remarkable from the standpoint of service, traffic and earnings in the history of the companies comprising the Chicago Surface Lines. Gross earnings for the year were $61,173,601, an increase of $2,387,720, or 4.06 per cent, as compared with the previous year. This total was the highest in the history of the companies. Operating expenses including taxes were $47,871,490, an increase of $1,243,283, or 2.67 per cent. Residue receipts were $13,302,112, an increase of $1,144,438, or 9.41 per cent. This was the highest with the exception of 1922, the year of an 8-cent fare. The city's share of divisible receipts was $2,620,326, an increase of $498,273, or 23.48 per cent over the preceding year. The purchase price of the properties was increased $237,632, making the total of $163,745,856 as of Feb. 1, 1927.

Each month of the year showed an increase in traffic over the corresponding month of the previous year and the impressive total of 1,574,969,902 rides is an increase of 57,459,241 rides, or 3.79 per cent. Revenue passengers totaled 876,249,663, an increase of 34,048,210, or 4.04 per cent. To provide service for this great increase in traffic there were added during the year more than 4,000,000 passenger car-miles.

The daily average of revenue passengers during December—2,505,338—was the highest for any month in the history of the companies. The peak of the previous twelve months was exceeded seven times during the year. The biggest day of the year and the greatest in the history of the companies, both in earnings and in traffic, was Saturday, Dec. 18, passenger receipts being $201,337, revenue passengers 2,934,771, and total rides 5,126,731. Revenue passengers on an average Saturday during the year numbered 2,668,342. On an average Sunday or holiday there were 1,632,844 revenue rides, an increase of 18,021 in two years. This is particularly interesting as most companies have experienced a decrease in Sunday and holiday business. There were 287 revenue passengers (or 517 rides including transfers) on surface cars during the year for every Chicagoan.

The Eucharistic Congress, from June 20 to June 24, inclusive, established new records for surface car riding in Chicago—the total rides for the three heaviest days being 15,069,000. Transportation of this immense throng with expedition and safety brought expres-

EARNINGS, EXPENSES AND DIVISION OF RESIDUE RECEIPTS OF THE CHICAGO SURFACE LINES FOR YEAR ENDED JAN. 31, 1927, COMPARED WITH PREVIOUS YEAR

| | 1927 | 1926 |
|---|---|---|
| Earnings: | | |
| Passenger cars | $60,436,705 | $58,076,487 |
| Chartered cars | 5,347 | 6,337 |
| Newspaper cars | 16,276 | 14,989 |
| Freight earnings | 5,039 | 4,867 |
| Hospital car service | 3,742 | 3,790 |
| Advertising | 281,837 | 274,480 |
| Rents of buildings, etc. | 160,885 | 165,150 |
| Sale of power | 108,210 | 104,097 |
| Interest on deposits | 132,366 | 120,682 |
| Miscellaneous | 23,188 | 14,997 |
| Gross earnings | $61,173,601 | $58,785,880 |
| Expenses: | | |
| Way and structures | $2,984,484 | $2,830,649 |
| Equipment | 4,188,633 | 3,984,635 |
| Renewals | 4,893,888 | 4,702,870 |
| Power—Maintenance | 386,086 | 394,620 |
| Power—Operation | 3,638,283 | 3,465,460 |
| Conducting transportation—Trainmen | 21,485,750 | 20,741,205 |
| Conducting transportation—Other | 3,214,031 | 3,172,423 |
| Traffic | 123,433 | 109,973 |
| General and miscellaneous—Damages | 1,936,202 | 2,469,007 |
| General and miscellaneous—Other | 1,620,696 | 1,697,361 |
| Taxes | 3,400,000 | 3,060,000 |
| Total expenses | $47,871,489 | $46,628,206 |
| Residue receipts | *$13,302,111 | *$12,157,674 |
| Divided: | | |
| Chicago Railways — 60 per cent | *$7,981,267 | *$7,294,604 |
| South Side Lines—40 per cent | *5,320,844 | *4,863,069 |

* Includes city's 55 per cent of net divisible receipts, as defined by ordinances.

sions of commendation from many sources.

In the period preceding the Christmas holidays, the peak of the year's riding, the companies attained 100 per cent operation. On Dec. 20 all passenger cars (3,639) were in service during the evening rush hours and on each of the three following days only one car was out of service. Henry A. Blair, president, says that better evidence could not be had of the condition of company equipment and the spirit of the men who worked together to accomplish this result.

In anticipation of the large increase in riding, 100 new cars of the multiple-unit type were ordered early in the spring and delivered in time for the pre-Christmas peak. This made a total of 445 new cars added to the service in a little more than three years.

Mr. Blair said it was worthy of note that during the past four years the Chicago Surface Lines have enjoyed a larger percentage of increase in passengers than any other street railway, and during the past year they carried approximately as many revenue passengers as all steam railroads in the country. It is also a fact that in spite of the handicap of expiring franchises, the 42 miles of track reconstruction and 5 miles of new track last year exceed the trackwork of any other surface system so far as available reports indicate.

Comparisons of extent of the Surface Lines' system at the end of the first year of unified operation (Jan. 31, 1915) and at the close of the thirteenth year (Jan. 31, 1927):

RESERVE FOR RENEWALS AND SPECIAL RESERVE FOR RENEWALS AND EQUIPMENT BY CHICAGO SURFACE LINES COMPANIES FOR FISCAL YEAR ENDED JAN. 31, 1927

| | Chicago Railways | Chicago City Ry. | C.&S.C.Ry. | Total |
|---|---|---|---|---|
| Reserve for Renewals: | | | | |
| Balance in reserve at Feb. 1, 1926 | $9,091,725 | $5,082,143 | $331,043 | $14,504,912 |
| Sale of unnecessary property and salvage | 197,166 | 41,799 | 7,417 | 246,384 |
| Interest earned | 279,328 | 155,013 | 10,131 | 444,473 |
| Balance in reserve at Feb. 1, 1927 | $9,568,220 | $5,278,957 | $348,592 | $15,195,770 |
| Special Reserve for Renewals and Equipment: | | | | |
| Balance in special reserve at Feb. 1, 1926 | $489,415 | $836,735 | $768 | $1,326,919 |
| 8 per cent of gross earnings | 2,936,332 | 1,765,855 | 193,993 | 4,896,181 |
| Interest earned | 18,076 | 23,813 | 655 | 42,544 |
| Total | $3,443,825 | $2,626,403 | $195,417 | $6,265,646 |
| Less: Expended for renewals | 2,399,317 | 1,410,113 | 193,807 | 4,003,237 |
| Expended for special equipment (new passenger cars) | 927,934 | 666,999 | ..... | 1,594,933 |
| Expended for track extensions | 3,303 | 273,422 | ..... | 276,725 |
| Expended for track reconstruction | ..... | 40,255 | 1,557 | 41,812 |
| Total expended | $3,330,555 | $2,390,789 | $195,364 | $5,916,709 |
| Balance in special reserve at Feb. 1, 1927 | 113,270 | 235,613 | 52 | 348,936 |
| Total of balances at Feb. 1, 1927 | $9,681,491 | $5,514,570 | $348,645 | $15,544,707 |

Under orders of the Public Utilities Commission of Illinois and of its successor, the Illinois Commerce Commission, $7,753,736.09 has been expended since July, 1920, out of the "Special Renewal and Equipment Fund" for new equipment and for track extensions and reconstruction.

Although the property acquired by these expenditures is functioning as part of the operating plant, it does not appear in the Capital Accounts of the companies, inasmuch as the commission orders provided that such expenditures shall not be carried to capital account "unless and until the sum or sums thus expended have been paid into the renewal and depreciation fund."

The balance, $15,544,707, in "Reserve for Renewals" and "Special Reserve for Renewals and Equipment" is a cash balance and is on deposit in various banks.

| Items | 1915 | 1927 | Per Cent Increase |
|---|---|---|---|
| Gross earnings | $31,966,049 | $61,173,601 | 91.37 |
| Operating expenses | 19,889,276 | 47,871,490 | 140.69 |
| Taxes | 1,439,279 | 3,400,000 | 136.23 |
| Operating wages paid | 10,560,039 | 29,812,518 | 182.31 |
| Total wages paid | 12,379,615 | 32,564,914 | 163.05 |
| Revenue passengers carried | 627,731,550 | 876,249,663 | 39.59 |
| Total rides | 1,115,312,129 | 1,574,969,902 | 41.21 |
| Average fare per revenue passenger | 4.99c | 6.90c | 38.28 |
| Average fare per ride | 2.81c | 3.84c | 36.65 |

A total of $107,141,358 has been paid for public benefits by the companies since the adoption of the 1907 ordinances, divided as follows: For cleaning right-of-way, including sprinkling and removal of snow and ice, $10,520,925; street paving, $15,968,578; maintenance paving, $6,094,824; general taxes, $33,572,782 (year 1926 estimated); track and overhead removal and replacement on account of sewer installation, etc., $1,889,378; city's 55 per cent of net earnings, $39,094,870.

In the past two years 2,984 cars, or 84 per cent of the 3,539 cars owned, were put through the shops. Adding to these the 100 new cars in the last few months made it possible successfully to accomplish the task of carrying record-breaking loads in the holiday period. Through co-operation between the transportation and shops and equipment departments, a new record was established also for the small number of cars taken out of service on account of equipment failures—the car mileage per pull-in being increased from 7,100 to 14,389. Each motor car on the system traveled an average of 37,445 miles during the year—another high mark in history. There are now in service 80 one-man cars and 95 trailer trains. The new type of multiple-unit cars, used in 66 trains, is giving entire satisfaction.

Interest of trainmen in the prevention of accidents was kept at a high point throughout the year by a contest among the various divisions which ended on Jan. 31, with North Avenue depot, the largest on the system, the winner, and Lincoln Avenue depot a close second. Results were so satisfactory that another contest has been started for the coming year.

TABLE OF INCREASE IN RIDING ON CHICAGO SURFACE LINES DURING PAST SIX YEARS

| Year Ended | Weekday Average | Saturday Average | Sunday* Average | Total for Year |
|---|---|---|---|---|
| Jan. 31, 1927 | 2,521,897 | 2,668,342 | 1,632,844 | 876,249,663 |
| Jan. 31, 1926 | 2,424,194 | 2,507,004 | 1,631,484 | 842,201,453 |
| Jan. 31, 1925 | 2,373,114 | 2,512,121 | 1,614,823 | 830,151,540 |
| Jan. 31, 1924 | 2,354,139 | 2,521,487 | 1,623,414 | 824,850,103 |
| Jan. 31, 1923† | 2,204,425 | 2,356,385 | 1,563,911 | 762,629,211 |
| Jan. 31, 1922 | 2,129,217 | 2,251,293 | 1,560,310 | 750,515,622 |

* Includes holidays.
† Trainmen's strike Aug. 1 to 6, 1922, inclusive.

Mr. Blair says that although the number of motor vehicles in the Chicago district increased greatly during the year, improved methods of traffic regulation facilitated the movement of street cars. As Mr. Blair sees it the public has been awakened as never before to an appreciation of the harmful effects of traffic delays. He then refers to the fact that late in the year there was issued under the direction of the street traffic committee of the Chicago Association of Commerce a report covering the local traffic situation and offering suggestions for relief. He says:

> Many recommendations will be helpful to users of street cars if put into effect. Action has already been taken by the City Council, providing for a Greater Chicago Street Traffic Commission and the creation of a division of traffic engineering in the Bureau of Streets. The big problem of automobile parking still awaits a solution. The prohibition of parking within the Loop district during the Eucharistic Congress demonstrated to the satisfaction of the authorities that, notwithstanding the overcrowded condition of the streets, traffic could be handled faster and more safely. Credit should be given to the traffic division of the Police Department for making the best of a difficult situation.

The favorable insurance contracts entered into in October, 1923, expired with the close of the last fiscal year with an unusually low record for losses during the period. Renewal of insurance beginning Feb. 1, 1927, was arranged on a basis which will result in a further saving. All insurable property of the companies, amounting to about $65,000,000, is covered as required by ordinance. This insurance, written at the rate in effect three years ago, would have cost the companies over $145,000 more per year than they are now paying.

On the subject of bus activities Mr. Blair said:

> While all other transportation agencies in the Chicago district showed an increase in traffic last year, the Chicago Motor Coach Company, in spite of additional routes, reported a material decrease in passengers carried. This would indicate that the novelty of bus operation in Chicago is wearing off and that this form of transportation is losing popularity, which may be due in part to the fact that the much heralded special and superior service with the pledge of a seat for every passenger has proved a myth. The bus company is still experimenting with different types of buses, and it has as yet no uniform or standardized equipment. Even with the newest model it is still employing the solid

CAPITAL EXPENDITURES BY CHICAGO SURFACE LINES FOR THE FISCAL YEAR ENDED JAN. 31, 1927

| | Chicago Railways | C. C. Ry. | So. St. Ry. | C. & S. C. Ry. | Total |
|---|---|---|---|---|---|
| Purchase price at Feb. 1, 1926.... | $94,258,468 | $55,819,970 | $1,800,900 | $11,628,884 | $163,508,224 |
| Capital expenditures during year.. | 299,152 | 57,438 | 328 | 87,185 | 444,104 |
| 15 per cent on same..... | 44,872 | 8,615 | 49 | 13,077 | 66,615 |
| Increase in fluctuating assets..... | *156,050 | *104,033 | ..... | ..... | *260,084 |
| 5 per cent on same..... | *7,802 | *5,201 | ..... | ..... | *13,004 |
| Purchase price at Feb. 1, 1927.. | $94,438,640 | $55,776,788 | $1,801,278 | $11,729,148 | $163,745,856 |

* Decrease..

STATISTICAL DATA OF CHICAGO SURFACE LINES FOR THE FISCAL YEARS ENDED JAN. 31

| | 1923 | 1924 | 1925 | 1926 | 1927 |
|---|---|---|---|---|---|
| Rate of fare..... | 8 cents 2-1-1922 to 6-14-1922 | 7c-6¾ cents | 7c-6¾cents | 7c-6¾cents | 7c-6¾ cents |
| | 7c-6¾ cents 6-15-1922 to 1-31-1923 | | | | |
| Revenue passengers..... | 762,629,211 | 824,850,103 | 830,151,540 | 842,201,453 | 876,249,663 |
| Passenger receipts..... | $55,495,310 | $56,986,687 | $57,284,602 | $58,076,487 | $60,436,705 |
| Total earnings..... | 56,103,061 | 57,655,169 | 58,081,678 | 58,785,880 | 61,173,601 |
| Operating wages..... | 27,163,996 | 27,458,736 | 29,246,390 | 29,012,641 | 29,812,518 |
| Other operating expenses and taxes..... | 17,252,072 | 17,381,016 | 17,328,569 | 17,615,564 | 18,058,971 |
| Residue receipts..... | 11,686,992 | 12,815,416 | 11,506,717 | 12,157,674 | 13,302,111 |
| Less: Joint account expenses..... | 620,000 | 885,000 | 450,000 | 130,297 | 363,934 |
| | $11,066,992 | $11,930,416 | $11,056,717 | $12,027,376 | $12,938,176 |
| 5 per cent on purchase price..... | 8,039,343 | 8,076,569 | 8,127,158 | 8,169,099 | 8,173,918 |
| 55 per cent to city..... | 1,665,206 | 2,119,615 | 1,611,257 | 2,122,052 | 2,620,325 |
| 45 per cent to companies..... | 1,362,442 | 1,734,231 | 1,318,301 | 1,736,224 | 2,143,902 |

tire, of which there is growing complaint not only from riders but from the owners and occupants of buildings along the bus routes, and from taxpayers who are charged with renewal of pavement.

The recent proposal of the Chicago Motor Coach Company to substitute buses for the street railways has excited little interest and has not been taken seriously by the general public.

In the last year that company was permitted to make an extension of its Marquette Road route along the north side of Marquette Park and also an extension of its South Park Boulevard line from 60th Street to 79th Street.

A hearing has been had by the Illinois Commerce Commission on the application of the Chicago Motor Coach Company for authority to establish additional routes in the north division of the city. In this case there is squarely presented for decision the question whether the Chicago Motor Coach Company shall be permitted to depart from its original plan and policy of boulevard and parkway operation and to establish a general motor bus service throughout the city in direct competition with the surface and elevated railways.

On Nov. 18, the commission entered an order authorizing and directing the Chicago Railways to operate an auxiliary or supplementary motor bus line on Diversey Avenue. The Chicago Motor Coach Company intervened in opposition to this order and is now seeking a review by the courts. There is still pending in the Illinois Supreme Court for decision the case in which the city is attacking the right of the Chicago Motor Coach Company to operate on city streets without first obtaining a grant of permission or authority from the city.

Interstate bus operation from adjacent cities in Indiana into Chicago continues, and no substantial change in this situation can be expected until Congress enacts a law for the regulation of this class of carriers.

A plan for the solution of the local transportation problem of Chicago was submitted to the Mayor and City Council on Jan. 8, 1927. It proposes the development of a complete rapid transit system, utilizing elevated and subway structures; the unification of the surface lines, rapid transit lines and feeder buses on the basis of one fare with transfers from one class of service to the other, and the development of this unified system with a view to the future needs of Chicago. The plan, which is worked out in elaborate detail, calls for a total investment in local transportation of $1,000,000,000 by 1950 and would give Chicago the best local transportation system in the world.

Mr. Blair says that contrary to experience in other cities, where the expiration of franchises has resulted in slackened maintenance, curtailment of service and loss of business, these properties approached the crisis in the best of condition physically and operating at a high degree of efficiency. He says that this remarkable showing has attracted attention in the industry everywhere and quotes from articles in both *Aera* and the ELECTRIC RAILWAY JOURNAL, to indicate the wide interest manifested in the Chicago situation.

Mr. Blair says that in the twenty years under the franchise that expired recently the properties have been completely rehabilitated. The roadbed has been rebuilt and 486 miles of single track added. There are now 35 miles of track per 100,000 population as compared with 27 miles in 1907. Old and small cars have been replaced by larger cars, and much additional equipment has been purchased. Seat miles (car miles multiplied by the average number of seats in the cars) are more than double the number in 1907, although the population has increased only 45 per cent, and the service improvement is even greater than this indicates because, by careful scheduling, cars are being operated where and when needed. According to Mr. Blair these facts show forcibly the remarkable improvement in service. In accomplishing it the companies have put $107,971,000 in new capital and $7,753,736 from the Special Renewal and Equipment Fund into the properties.

Although wage rates of employees have increased upwards of 175 per cent since 1907, the average fare per revenue passenger is only 39 per cent higher and the average fare per ride but 28 per cent higher.

During the thirteen-year period of unification the companies have constructed 119 miles of new extensions (single track equivalent) at a cost of $6,220,693 and reconstructed 476 miles of single track at a cost of $27,642,318, of which $19,666,967 was paid out of the renewal funds and $7,975,350 was new capital.

**Statement of Track Mileage of Companies Included in Chicago Surface Lines System**

| | Total Miles Single Track 1-31-26 | Extensions 1926 | Abandoned 1926 | Net Extensions 1926 | Miles Single Track 1-31-27 | *Reconstructed 1926 |
|---|---|---|---|---|---|---|
| Chicago Railways..... | 594.34 | 0.90 | 0.44 | 0.46 | 594.80 | 28.17 |
| Chicago City Railway..... | 335.97 | 3.67 | 0.04 | 3.63 | 339.60 | 12.15 |
| Calumet & South Chicago Railway..... | 127.21 | 0.80 | 0.04 | 0.76 | 127.97 | 1.90 |
| Southern Street Railway..... | 17.45 | .... | .... | .... | 17.45 | .... |
| | 1,074.97 | 5.37 | 0.52 | 4.85 | 1,079.82 | 42.22 |

* Includes track taken up and replaced account of sewers, special straight track renewals, etc.

## Union of Washington Lines Goes Over to Next Session

One of the first problems to be studied at the next session of the United States Congress will be the merger of the railway lines in Washington, D. C. Chairman Capper said that with the work of creating the new Public Utilities Commission completed the committee would be in a position to concentrate on the question of the merger at the next session. The possible merger in the capital was one of the measures left unacted upon at the recently concluded session of Congress.

## Columbia System Suspends

Railway service at Columbia, S. C., was indefinitely suspended on March 11 by the Columbia Railway, Gas & Electric Company largely because business has fallen off to a point where the expenditures needed to be made to the physical property to put it into proper operating condition would not be justified. Columbia is a city of more than 35,000 population. The railway system included 32 miles of line.

Ten-cent jitneys, operated at the whim of the owner, covering no particular territory but picking up passengers any and everywhere and taking them direct to their destinations—be it home or office—cut heavily into the patronage of the trolleys. They were considered quicker, the fare was the same as that charged by the street cars, and while they were often unsightly and in bad repair, their service seemed to appeal to popular tastes. Moreover, the street cars have met with sharp competition from two other systems of transportation. The Carolina Transit Company began the operation of about a score of 19-passenger buses some months ago, covering territory not touched directly by the railway lines, and as rapidly as the street cars would curtail their service, the bus company would expand, so as to serve, in a measure, the territory abandoned by the railway. By an arrangement between the two companies transfers from one system to the other were granted, but this arrangement did not seem to lessen materially the distress of the railway.

Months ago railway officials made known the straits to which they were reduced. One non-paying line after another was discontinued until only a few were left. Last month, on all lines in the city, not more than an average of 600 to 700 passengers a day rode the cars.

# Personal Items

## J. E. Wilmot Becomes Traffic Solicitor at Buffalo

J. E. Wilmot, formerly general manager of the Western New York Motor Lines, has been appointed general traffic solicitor for the International Railway and International Bus Corporation, according to a recent announcement issued by the company. He will devote his efforts to the stimulation of business throughout the Niagara frontier, including the Buffalo-Niagara Falls high-speed line, Niagara Great Gorge trip, the Falls View Bridge, the Queenston-Lewiston Suspension Bridge and Buffalo-Niagara Falls, Ltd., motorbus service.

Mr. Wilmot is a native of New York City, but is well known in Buffalo and vicinity because of his former connection with the Western New York bus lines, of which he was general manager. Under his direction the Rochester-Buffalo bus service was installed and operated. Mr. Wilmot has had five years experience with the White Company and three with the Mack.

J. E. Wilmot

## F. J. Brennan New Brooklyn Division Superintendent

Francis J. Brennan, formerly superintendent of maintenance and operation of the Staten Island Railways, Department of Plant and Structures, New York City, has been appointed division superintendent at Maspeth Depot of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y.

Mr. Brennan was born in Brooklyn and was graduated from Erasmus Hall High School and Pratt Institute. In January, 1905, he was appointed a motorman at the 58th Street depot in Brooklyn. In December of the same year he resigned but returned two years later in the same capacity at the same depot. After several promotions he went with the Public Service Commission but returned to Brooklyn as supervisor of headways in the surface transportation department. He held that position until May, 1924, when he was placed in charge of operation of the bus subsidiary of the B.-M. T.

In March, 1925, Mr. Brennan resigned his position with the B.-M. T. and was appointed superintendent of maintenance and operation of the municipal railway lines on Staten Island.

## G. S. Wills Resigns at East Liverpool

Gerry S. Wills, superintendent of the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, will resign on March 31.

Mr. Wills went to East Liverpool in September, 1925, from Wheeling, W. Va., where he had been general manager of the Wheeling Traction Company. For thirteen years he was in the employ of the West Penn Company, by which the Wheeling Company was controlled. In the fall of 1920 he went to Wheeling as assistant to C. P. Billings, vice-president and general manager, and on Jan. 1, 1922, was appointed general manager to fill the vacancy caused by the transfer of Mr. Billings to Pittsburgh.

As a young man Mr. Wills was employed by the Oneonta & Mohawk Valley Railway, Oneonta, N. Y., with which he remained from 1905 to 1906, when he secured a place as an apprentice in electrical engineering with the General Electric Company at Schenectady, N. Y. In 1907 Mr. Wills went with the Metropolitan Street Railway, New York City, as general carhouse electrician. His work there was supplemented by a two-year course in applied electricity at Pratt Institute.

Mr. Wills showed predilection for the railway business, however, for after two and a half years in the copper mining district of Arizona he returned East and entered the transportation department of the Citizens Traction Company at Oil City, Pa. In a short time he was made superintendent of the Franklin division. In 1916 he became affiliated with the West Penn interests at Pittsburgh, first with the general sales manager, as light salesman, then as power salesman and finally as assistant to the vice-president in charge of the commercial department. Mr. Wills was born in Norfolk, Va., in 1884. His activities and splendid results in public relations work in Wheeling were referred to in a review of Mr. Wills' career in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 8, 1925. To him properly belongs a large part of the credit for the successful rehabilitation of the property at East Liverpool, described in detail in the ELECTRIC RAILWAY JOURNAL, issues of June 26, 1926; July 3, 1926, and July 31, 1926. It is said that Mr. Wills will engage in the brokerage business in Norfolk, Va.

## C. L. Wilson Heads Radial Department at Toronto

Charles Lewis Wilson has been appointed superintendent of the radial department of the Toronto Transportation Commission, Toronto, Canada. Mr. Wilson's contacts in railway management extend over a period of 30 years. His experience acquired in his recent position as superintendent of the Toronto and York District of the Ontario Hydro-Electric Railways will be of invaluable assistance to the Toronto Transportation Commission, which took over these lines on Jan. 11.

The new head of the radial department started his railway career with the Grand Trunk Railway, Montreal, in 1891. In 1892 he moved to Toronto to take a position with the Toronto Railway. After twelve years service in various capacities he was made traffic manager of the Toronto & York Radial Railway, then under the same ownership as the Toronto Railway.

C. L. Wilson

Later he was promoted to assistant manager and when the city of Toronto bought the radial lines in 1922 and placed them under the management of the Ontario Hydro-Electric Power Commission Mr. Wilson was made superintendent of the three lines, which now constitute the radial department of the Toronto Transportation Commission.

His long association with the radial lines and the warm friendships he has formed are among the valuable assets of the most recent addition to the Toronto Transportation Commission services. Mr. Wilson was born in Boston, Mass., of Canadian parents in 1871.

**Charles H. Bucher**, for a number of years with the Northern Texas Traction Company, which operates the Dallas-Fort Worth Interurban, has been made district representative of the company. He will be stationed at Grand Prairie.

**G. R. G. Conway** has succeeded R. C. Brown as president of the Mexican Tramways, Mexico City, Mexico, which is controlled by English capital and has its main office in Toronto, Canada. Mr. Brown remains a director, a vice-president and in a consulting capacity.

# Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

## Brill Gets First Motors for Philadelphia Subway Cars

Actual operation of Philadelphia's new $100,000,000 North Broad Street subway was brought a step closer March 15 with the arrival at the J. G. Brill plant of the driving motors, electrical controls and other equipment for the first of the 150 passenger cars ordered by the city and to be built by the Brill company. When completed these cars, of all steel construction, will embody every conceivable safety device, including automatic stop controls. Their total cost will approximate $6,000,000.

The equipment was shipped from the East Pittsburgh Works of the Westinghouse Electric & Manufacturing Company, this company having been awarded the contract for all the motive equipment, including controls, as well as 750 especially designed electric fans for the ventilation of the new cars.

The cars, with 210-hp. motors, will be 67 ft. long, 10 ft. wide and have a total height from the rails to the roof of 12 ft. 3 in. They will seat 75 passengers. There will be longitudinal seats for 25 passengers and transverse seats for 50 passengers. The cars are being equipped with canvas-lined rattan seats with cone springs.

## Milwaukee Electric Starts Interurban Cut-Off Work

Favored by mild weather, the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has already started construction work on the new $175,000 East Troy-Burlington interurban line cut-off which will connect West Junction on the rapid transit line with Fruitland station on the Burlington-East Troy line. The cut-off will permit trains to enter Milwaukee directly from the west instead of through West Allis, as at present. Completion of the connection will cut the running time between these cities and Milwaukee fully twenty minutes. Two trestles will be built, one of wood 450 ft. long and 40 ft. high and another of steel carrying the new line over parallel tracks of the Milwaukee Electric Railway & Light Company and the Northwestern Railway. An embankment of earth estimated at 54,000 cu.ft. will be included in the project.

## Writ of Certiorari Denied in Resale Case

The Federal Trade Commission was defeated in another of its efforts to restrict enforcement of resale prices by manufacturers when the United States Supreme Court on March 14 declined to grant a writ of certiorari sought by the commission to review a decision of the Circuit Court of Appeals for the second circuit enjoining an order of the commission against Harriet Hubbard Ayer, Inc.

The commission had ordered the Ayer company to desist from certain practices to maintain observance of retail prices. The Circuit Court of Appeals, to which the company appealed, held that in order to establish unlawful price maintenance there must be a tendency to monopolize a line of commodities or an unreasonable restraint of trade; that there must be proved a general system of contracts between the manufacturer and all dealers, and that the practices must be characterized by fraud. The proof showed that the Ayer company refused to sell to only a few dealers because of price cutting and that most of its dealers maintained the resale price of the cosmetics sold by the company voluntarily.

## Union Switch & Signal Gets Big Boston Contract

The city of Boston transit department has contracted with the Union Switch & Signal Company, Swissvale, Pa., to furnish all necessary automatic block signaling materials for the Dorchester rapid transit extension, involving an automatic block signaling system for the protection of train movements over 3½ miles of double track, 2½ miles of which is in the open and the remainder within the subway. Direct current at 550 to 600 volts is used for propulsion and the entire signal system, including the track circuits, will operate on 25-cycle alternating current fed to the transformers at 550 volts a.c. The signals will be of the color light type (indicating red, yellow and green), the work involving 38 light signals with instrument cases, 52 automatic stop layouts, 114 a.c. relays, 113 transformers, 91 Keystone insulated rail joints with track resistors, switch circuit controllers, etc.

# Conference on Steel Cars Called in New York

THE New York Transit Commission on March 11 invited railway men and others to a conference on the subject of lighter steel cars to replace the present wooden cars in operation on the elevated structures in New York City. The meeting will be held on March 29 at the office of the commission at 270 Madison Avenue. Those invited to the conference are Frank Hedley, president of the Interborough; William S. Menden, president of the B.-M. T.; William H. Woodin, president of the American Car & Foundry Company; F. N. Hoffstet, president of the Pressed Steel Car Company; D. A. Crawford, president of the Pullman Company, and John H. Delaney, chairman of the city Board of Transportation.

For some months the commission, through its engineering force, has been conducting an investigation into the possibility of the development of a steel car sufficiently light in weight to be operated on the elevated structures of Manhattan, Brooklyn, the Bronx and across the Brooklyn Bridge.

The studies of its engineers have now reached a point where the commission feels that a conference is warranted, but it fixed an advance date to allow engineers time within which to gather their data on the present condition and weight capacity of the elevated structures and the experts of both the railroads and the car builders to formulate plans for the construction of modern steel cars light enough in weight to operate on the structures to which specific reference is made.

Where elevated structures are of insufficient strength to make possible the operation thereon of steel cars of the present design, the Transit Commission has pointed out that either these structures must be reinforced or a steel car of lighter weight must be designed. As the commission sees it, to reinforce the elevated structures so that they could bear the weight of the present steel cars would cost millions of dollars and would doubtless fail to have the approval of that portion of the public which is opposed to the indefinite retention of elevated structures. The commission says:

> Some time ago the Transit Commisssion's engineers began to plan for a lighter steel car for operation on the present elevated structures. These plans have progressed to such an extent that it was thought advisable to call the conference referred to.
>
> Steel cars for rapid transit operation were not developed until 1904. Up to that time all rapid transit operation was by means of wooden cars. Subsequent to the development of the steel car in 1904 more wooden cars came into operation because of the inability of the elevated structures to carry the new steel cars.
>
> The Transit Commission's engineers believe that recent progress in metallurgy and modern methods of steel rolling have made possible the designing of a steel car of lighter weight than, but of equal tensile strength to, the present steel cars.

## Bradley and Wason Companies May Get $700,000 Car Order

Osgood-Bradley Car Company of Worcester, Mass., and Wason Manufacturing Company, Springfield, Mass., are expected to get the contracts for the new cars which the Worcester Consolidated Street Railway and the Springfield Street Railway plan to buy under the New York, New Haven & Hartford Railroad rehabilitation program. The Worcester company will build 50 cars for the Worcester Consolidated and the Wason company the 50 cars for the Springfield company. The cost of the cars is estimated at $700,000. Notice of the probable placing of this order was made in the JOURNAL for Feb. 19.

## $800,000 Trackwork for Milwaukee if Council Consents

Application has been filed with the Common Council of Milwaukee, Wis., by the Milwaukee Electric Railway & Light Company for the necessary franchises which are needed to carry out several major street railway construction projects estimated to cost $800,000. Among these proposed improvements is the relocation and grade separation of the Milwaukee - Waukesha - Watertown rapid transit line for a distance of ten blocks within the Milwaukee city limits, a project which is regarded as one of the most important steps made in recent years toward improving transportation facilities. If approved by the city it will open the way for rapid transit service to a large and growing section and a vast area directly in line for annexation to Milwaukee. Plans call for the line to be relocated for a block south on a private right-of-way instead of running along Fairview Avenue. Grades will be separated at all crossings, and 61st and 62d Streets will be closed.

Another improvement proposed is the extension, within 90 days, of the Eighth-Muskego Avenue line along Teutonia Avenue from Nash Street to Lake Avenue and later to Atkinson Avenue. As soon as street improvements are completed on Atkinson Avenue a connection will be made between the Milwaukee Northern line tracks and those of the Eighth-Muskego Avenue line at Teutonia and Atkinson Avenues.

In order to provide a more direct connection between Wauwatosa and West Allis, which is another step toward the solution of the problem of rapid transit between those cities and Milwaukee, a crosstown line is to be built on 68th Street between Wells Street and the relocated rapid transit tracks, subject to later negotiations with the city of Wauwatosa. Upon completion of the 68th Street connection the company will seek permission to discontinue service over the private right-of-way near 51st Street between Wells Street and the rapid transit tracks.

## St. Louis Car Company Issues New City Car Catalog

Designed especially to feature developments in the light-weight city type car, the St. Louis Car Company is mailing out a handsome 44-page catalog which contains, among other interesting features, general dimensions and a brief description of car orders filled in recent months. The text matter is profusely illustrated with exterior and interior views, and with floor plans of the various type cars. There is also a full list of details which the company considers essential in order to expedite delivery.

## Commerce Department Warns Against Fake Publicity

Through Julius Klein, its director, the Department of Commerce, Bureau of Foreign and Domestic Commerce, has just issued the following letter warning American manufacturers against a gold brick publicity scheme that has originated with certain publishers abroad.

Certain foreign publishing concerns, or parties purporting to be publishers, have approached a large number of American manufacturers by correspondence, offering to prepare and publish, without charge, in their trade publications articles of public interest respecting the business organizations of American concerns. An exchange of correspondence usually leads to the preparation of the article and finally to an exorbitant debit against the American concern involved for halftone cuts. The charges have varied between $100 and $600. Inasmuch as our investigations have developed that the publications have no circulation or standing and that an indication of fraud is very evident, it is suggested that you avoid direct dealings with any such publishers until after adequate investigation has been made.

If approached in this way it would be well, before responding, to consult responsible American advertising agencies or this bureau. If you submit the name of the publication and the publisher to the specialties division of the bureau you will be informed whether these names are already known in connection with cases where other firms have been victimized. If you have had past experience with this class of solicitation, you will increase the effectiveness of our efforts to safeguard American industries by making the details available for the confidential use of this bureau.

## *Rolling Stock*

**Houston Electric Company, Houston, Tex.**, has placed an order for twenty new cars and ten buses, according to a recent announcement made by C. J. Kirk, Public Works Commissioner.

**Mack Truck, Inc., New York City,** reports the following bus sales to street car companies during the last few weeks: Boise Street Car Company, Boise, Idaho; Houston Electric Company, Houston, Tex.; Third Avenue Railway, New York City; Connecticut Company, New Haven, Conn., and the Utah-Idaho Central Railway, Ogden, Utah.

**American Car Company, St. Louis, Mo.**, has been awarded a contract for seven 45-ft. 6-in., single-end passenger and smoking motor bodies by the Rockford Public Service Company, Rockford, Ill., which is part of Rockford & Interurban Railway, recently reorganized. Notice of the expected placing of this contract was carried in the JOURNAL of Feb. 19. The new bodies will be mounted on Brill 177-E trucks.

## *Track and Line*

**Arkansas Central Power Company, Little Rock, Ark.**, will lay new steel and permanent paving between its rails on Prospect Avenue from Lee Avenue to St. Mary's Academy, if plans to be submitted to the City Council are approved. The improvement, entailing a cost of approximately $150,000, will be one of the major construction jobs of the 1927 program of the concern, and will be the first work done under the 1927 budget. Rails of heavier section will replace the present 70-lb. rails now employed on the Pulaski Heights line. Work has been started on laying new tracks along Main Street from the north approach of the Main Street viaduct to 22d Street. All of the old rails have been removed and the new rails will be laid before work of paving the street is started.

**Indiana Service Corporation, Fort Wayne, Ind.**, plans to extend during the coming summer its car lines in Fort Wayne. Such a project was discussed at the last meeting of the Board of Public Works. No definite arrangements were made, although President Feustel said more tracks would be needed badly before the summer was over.

## ELECTRIC RAILWAY MATERIAL PRICES—March 15, 1927

### Metals—New York

| | |
|---|---|
| Copper, electrolytic, cents per lb. | 13.075 |
| Lead, cents per lb. | 7.65 |
| Nickel, cents per lb. | 35.00 |
| Zinc, cents per lb. | 7.05 |
| Tin, Straits, cents per lb. | 69.375 |
| Aluminum, 98 or 99 per cent, cents per lb. | 26.00 |
| Babbitt metal, warehouse, cents per lb.: | |
| Commercial grade | 61.00 |
| General service | 31.50 |

### Bituminous Coal

| | |
|---|---|
| Smokeless mine run, f.o.b. vessel, Hampton Roads | $4.575 |
| Somerset mine run, Boston | 1.95 |
| Pittsburgh mine run, Pittsburgh | 1.85 |
| Franklin, Ill., screenings, Chicago | 2.625 |
| Central, Ill., screenings, Chicago | 1.875 |
| Kansas screenings, Kansas City | 2.50 |

### Track Materials—Pittsburgh

| | |
|---|---|
| Standard steel rails, gross ton | $43.00 |
| Railroad spikes, drive, $\frac{5}{8}$ in. and larger, cents per lb. | 2.90 |
| Tie plates (flat type), cents per lb. | 2.35 |
| Angle bars, cents per lb. | 2.75 |
| Rail bolts and nuts, cents per lb. | 4.20 |
| Steel bars, cents per lb. | 1.90 |
| Ties, white oak, Chicago, 6 in.x8 in.x8 ft. | $1.45 |

### Hardware—Pittsburgh

| | |
|---|---|
| Wire nails, base per keg | 2.55 |
| Sheet iron (24 gage), cents per lb. | 2.75 |
| Sheet iron, galvanized (24 gage), cents per lb. | 3.65 |
| Galvanized barbed wire, cents per lb. | 3.25 |
| Galvanized wire, ordinary, cents per lb. | 2.40 |

### Waste—New York

| | |
|---|---|
| Waste, wool, cents per lb. | 12–18 |
| Waste, cotton (100 lb. bale), cents per lb.: | |
| White | 13–17.50 |
| Colored | 10–14 |

### Paints, Putty and Glass—New York

| | |
|---|---|
| Linseed oil (5 bbl. lots), cents per lb. | 10.80 |
| White lead in oil (100 lb. keg), cents per lb. | 14.50 |
| Turpentine (bbl. lots), per gal. | $0.78 |
| Putty, 100 lb. tins, cents per lb. | 5.25–5.50 |

### Wire—New York

| | |
|---|---|
| Copper wire, cents per lb. | 15.25 |
| Rubber-covered wire, No. 14, per 1,000 ft. | $5.50 |
| Weatherproof wire base, cents per lb. | 16.75 |

### Paving Materials

| | |
|---|---|
| Paving stone, granite, 5 in. New York—Grade 1, per thousand | $130–$142 |
| Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd. | $2.70 |
| Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots | 51.00 |
| Paving brick 3x8½x4 N.Y., per 1,000 in carload lots | 45.00 |
| Crushed stone, ¾-in., carload lots, N. Y., per cu.yd. | 1.94 |
| Cement, Chicago consumers' net prices, without bags | 2.05 |
| Gravel, ¾-in., cu.yd., f.o.b. N. Y. | 1.75 |
| Sand, cu.yd., f.o.b. N. Y. | 1.00 |

### Old Metals—New York and Chicago

| | |
|---|---|
| Heavy copper, cents per lb. | 11.00 |
| Light copper, cents per lb. | 9.50 |
| Heavy brass, cents per lb. | 7.125 |
| Zinc, old scrap, cents per lb. | 4.25 |
| Lead, cents per lb. (heavy) | 6.375 |
| Steel car axles, Chicago, net ton | $17.25 |
| Cast iron car wheels, Chicago, gross ton | 15.25 |
| Rails (short), Chicago, gross ton | 16.75 |
| Rails (relaying), Chicago, gross ton (65 lb. and heavier) | 28.50 |
| Machine turnings, Chicago, gross ton | 7.50 |

*Rain or Shine—*

The Peacock Staffless

# "Peacock" Staffless Brakes!

Reg. U. S. Pat. Off

Weather conditions have no effect on their braking power! They have a chain winding capacity of 144 inches enabling them to develop maximum braking power under all conditions!

There are many other advantages which especially adapt them to modern car design—lightweight—small platform space occupation—improved appearance of platform—low installation and maintenance costs—simple, yet dependable operation—three times the braking power of ordinary hand brakes—and many others. That is why they are specified on nearly all modern cars!

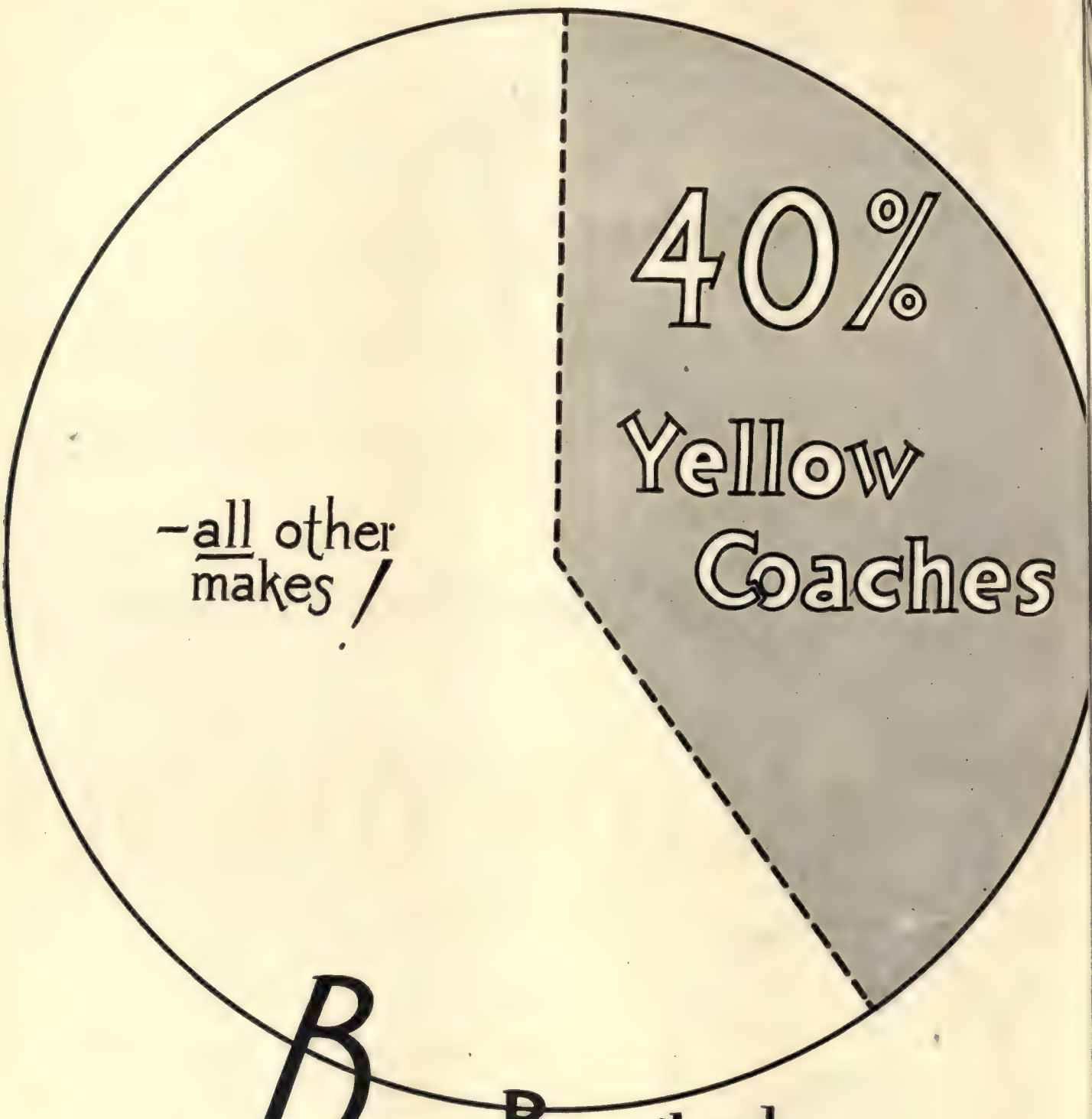
May we furnish you with detailed information and statement of what they have done for others and what we know they will do for your cars?

National
Brake Company, Inc.

890 Ellicott Square, Buffalo, N. Y.

*Canadian Representative*

Lyman Tube & Supply Co., Ltd., Montreal, Can.




# Buses Bought by Street Railway Companies in 1926

# What more

expressive tribute could the Street Railway Companies of this country pay to the quality and the value of

# YELLOW COACHES

*A General Motors Product*

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.

# WISCONSIN AXLES

ITS rugged appearance appeals to motor truck and motor coach buyers. They know instinctively that Wisconsin one piece housing and gear carrier construction will keep gears, differential and bearings in perfect alignment—that safety is assured by powerful oversize brakes.

Wisconsin Axles are produced for trucks rated from 1 to 7 tons—for buses seating 15 to 60 passengers.

Special designs are available for rail-cars, gas-electrics and tractors.

**Wisconsin Parts Company - Oshkosh, Wis.**

# COLOR

## SELLS RIDES

## *and Valentine knows color!*

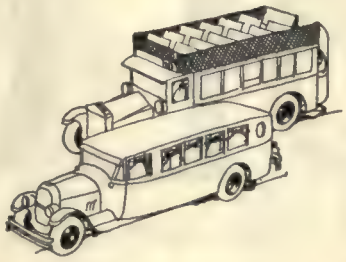
Nobody rides from preference in shabby looking cars, whether private automobiles, buses or electric railway coaches.

Clean, well-finished cars are a splendid advertisement. They help to sell rides. And today the finest and most durable finishes can be had in attractive business-getting colors.

Because the proper use of Color does sell rides, The Valentine Technical Staff has studied this subject with great care. Any manufacturer or operating company interested in increasing his business in this way, and in a practical, economical, durable system of street car finishing that keeps a car on the job and out of the paint shop, is invited to avail himself of the cooperation of the Valentine Staff. Address Valentine & Company, 456 Fourth Avenue, New York.

**VALENTINE'S FINISHES**

*The Valentine Colors are available in Japan, Oil or Lacquer and in practical finishing systems that meet individual requirements. Valentine & Company will be glad to place their technical knowledge of color, painting and painting systems at the disposal of interested railway executives.*



A wheel may look good on paper. It may show up well in laboratory service. But it's mighty important to know what it has done *under actual fire.*

That's the test.

What Budd-Michelin has done in the past has put it on every heavy bus in operation. What it is doing today is *keeping* it there.

That's the thing to go by.

BUDD
WHEEL COMPANY
*Detroit*

# DURBAN, *South Africa*

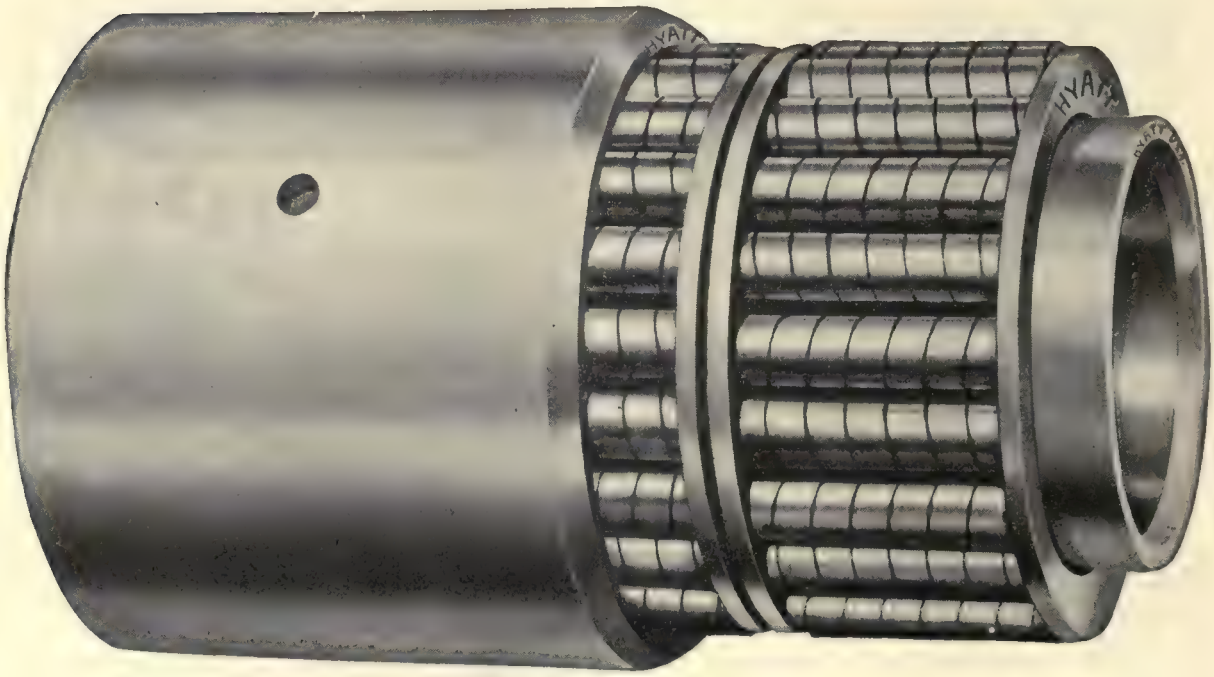
THE mail boat "Kenilworth Castle," arriving at Durban, Natal, South Africa, from England, is met by two conveyances from the Marine Hotel. The International Motor Coach and the low, swift truck built by International to the highest standard, make many trips weekly to the docks at the port and meet twelve trains daily coming over the South African Railways.

Managing Director Joel of the Marine Hotel is an enthusiast on the subject of International Motor Coaches, and so are a multitude of owners closer home and the world around. International Harvester offers the operator this quality coach at low cost. The inviting interior holds perfect comfort for 15 passengers in the Club Coach and for 17 in the Sedan-type Coach. Distinctive lines, easy riding features, and all-around economy recommend this unit for every passenger transportation enterprise. Service through 125 Company-owned branches in the U. S. *May we send detailed information?*

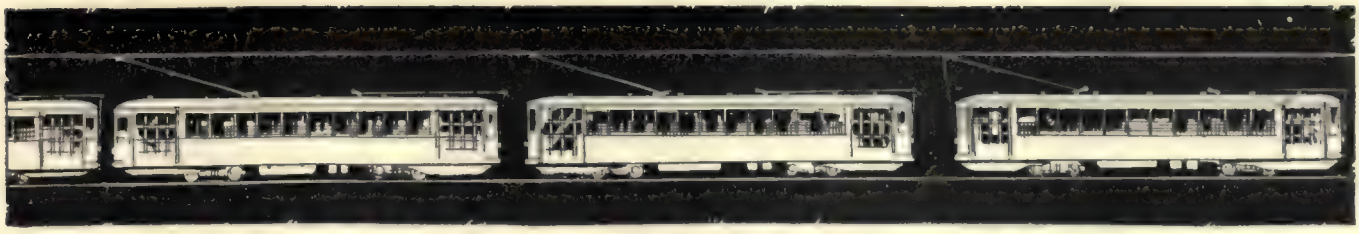
INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. of America (*Incorporated*) Chicago, Illinois

# INTERNATIONAL *6-cylinder* Coaches

# HYATTS are



The advantages and economies of Hyatt Roller Bearings are worth investigating. Every A. R. E. A. requirement for standard equipment or replacement is met.



# easier on the car

# *–and its passengers*

Jerky starts and the power-wasting drag of friction bearings when running are banished forever with the use of Hyatt Roller Bearings in car journals.

Smooth starts, rapid pick-ups and quick, cushioned operation are Hyatt contributions to greater car comfort and punctual railway service.

Hyatt bearings are practically frictionless. The sturdy rollers rotate with the wheels in a natural, easy motion — reducing friction and wear, and cutting power costs appreciably.

The only attention Hyatts require is three or four lubrications a year. Bearing repairs and replacements are unheard of. Hyatts keep the cars busy earning profits instead of wasting time in repair shops.

HYATT ROLLER BEARING COMPANY
NEWARK, N. J.

# HYATT

## QUIET ROLLER BEARINGS

PRODUCT OF GENERAL MOTORS

*The Canadian Fairbanks-Morse Company, Ltd., Distributors of Hyatt Railway Bearings in Canada*

# Something new~ the only tire of its kind - - The *Heavy Express Special* built to carry the load and stand up under high speed bus operation

*The*

# GENERAL

## TIRE

*—goes a long way to make friends*

BUILT IN AKRON, OHIO, BY GENERAL TIRE AND RUBBER CO.

# WHITE ENTERS LOW PRICE LIGHT DELIVERY FIELD

## *Announcing Reduced Prices Placing WHITE Transportation within the Reach of Everyone*

| Model 15 ¾-1 TON CHASSIS | | Model 20 1½ TON CHASSIS |
|---|---|---|
| $2150 NET | ← OLD PRICES → | $2950 NET |
| $1545 F.O.B. FACTORY | ← NEW PRICES → | $2125 F.O.B. FACTORY |
| $605 | ← SAVING → | $825 |

WHITE transportation is today within the reach of every field of business and industry. Because of the increasing demand for quality truck performance, The White Company announces a broadening of its merchandising policy resulting in reductions in the prices of two models of four-speed light delivery trucks.

White is extending its area of transportation service—entering a wider field of fast, light delivery and establishing a complete range of truck capacity and price never before equaled by any high-grade truck manufacturer.

The name and reputation of White is insurance of continued high quality. These are the same high-grade White Trucks—at lower prices—the same standard specifications. For years the four speed White Model 15 and Model 20 have been the outstanding quality trucks in the light delivery field. No truck of the same size or capacity (¾-ton, 1-ton and 1½-ton) compares with them in dependable, low-cost transportation over hundreds of thousands of miles.

Throughout the chassis construction of the White Model 15 and Model 20 you will find inbuilt quality, ruggedness and exclusive White mechanical features that are not duplicated in any other light delivery truck at any price.

THE WHITE COMPANY, CLEVELAND

Please send me complete specifications, etc., covering White Light Delivery Trucks at reduced prices.

NAME .....

FIRM .....

STREET .....

CITY .....

Electric Railway Journal

*Terms—Operators wishing to buy trucks on terms can do so*

THE WHITE COMPANY, CLEVELAND

# WHITE TRUCKS

## and WHITE BUSSES

*One of the Goodyear-equipped fleet of buses operated by the Yosemite Park and Curry Co.*

GOODYEAR

Copyright 1927, by The Goodyear Tire & Rubber Co., Inc.

# Now SUPERTWIST Makes A Better Goodyear Bus Tire

You know what rugged strength and long life have always been built into Goodyear Pneumatic Bus Tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for balloon tire, motorbus and heavy duty cord tires.

It far outstretches ordinary cotton cord, and has a maximum flexing power that yields under impact, protecting the tire from rupture, stone bruise and other injuries. It thus insures virtually *double* the *carcass* life of the tire.

Other features of the Goodyear Pneumatic Tire construction for motorbus service are: (1) the new Goodyear band-building method; (2) the new Goodyear breaker; (3) the new Goodyear bead—patent applied for; (4) the famous All-Weather Tread.

These advantages you get only in Goodyear Pneumatic Bus Tires—the only motorbus tires made of SUPERTWIST.

They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort, and long, trouble-free mileage at low cost.

*For every Goodyear Cord Bus Tire there is an equally fine Goodyear Tube, built especially to the needs of bus service*

# BUS TIRES

*Made with SUPERTWIST*

# The *Silent* Worm—

its users look upon it as the ideal final drive; for its rugged simplicity, long-lived economy, and noiseless efficiency.

THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

# TIMKEN AXLES

# windows DO MAKE A DIFFERENCE in the *convenience* of the bus

*Bus for New York State Railways using Edwards Metal Sash. Bender Body on White Chassis.*

**Shall we send you our catalog? Describes and illustrates various types. Gives list of users.**

BUS windows that are easy to open and close, that never stick and never rattle—

Bus windows that are practically "all glass", with a minimum of post and rail—

Such windows surely help make a bus convenient.

Edwards Metal Sash insures this convenience in bus windows.

Plus comfort, and quiet, and excellent appearance.

## O. M. EDWARDS CO.

New York Syracuse, N. Y. Chicago

**Canadian Representatives: Lyman Tube & Supply Co., Ltd., Montreal and Toronto**

# Edwards Metal Sash

*for*

MODERN
CAR
UPHOLSTERY
*you can't do better than*
*PLUSH*

# *No other material is quite so comfortable as plush—*

Hundreds of thousands of smooth, silky, SPRINGY little fibers actually support the passenger riding on a Mohair Plus seat. They absorb quite a little of the vibration, and hold the occupant of the seat firmly in place.

That is one reason why railroads have *standardized* on Mohair Plush for all deluxe and long distance rolling stock.

No other seat covering material gives quite this comfort, because no other material has the Mohair plush "pile" surface. And not only does this make for more comfort, it makes for longer life, too. Twenty years service is not unusual for genuine Massachusetts Mohair Plush.

Remember these facts when you specify seat covering materials. The newest patterns provide for every class of service.

*Samples and quotations on request.*

MASSACHUSETTS MOHAIR PLUSH CO.

New York Agent:
Sisson Supply Co.
1845 Grand Central Terminal,
New York City

Main Office
200 Devonshire Street, Boston, Mass.
Makers of BAY STATE PLUSH

Western Agent:
Midgley & Borrowdale
1822 McCormick Building,
Chicago, Illinois

# MASSACHUSETTS MOHAIR PLUSH

*The railroad standard for over 35 years*

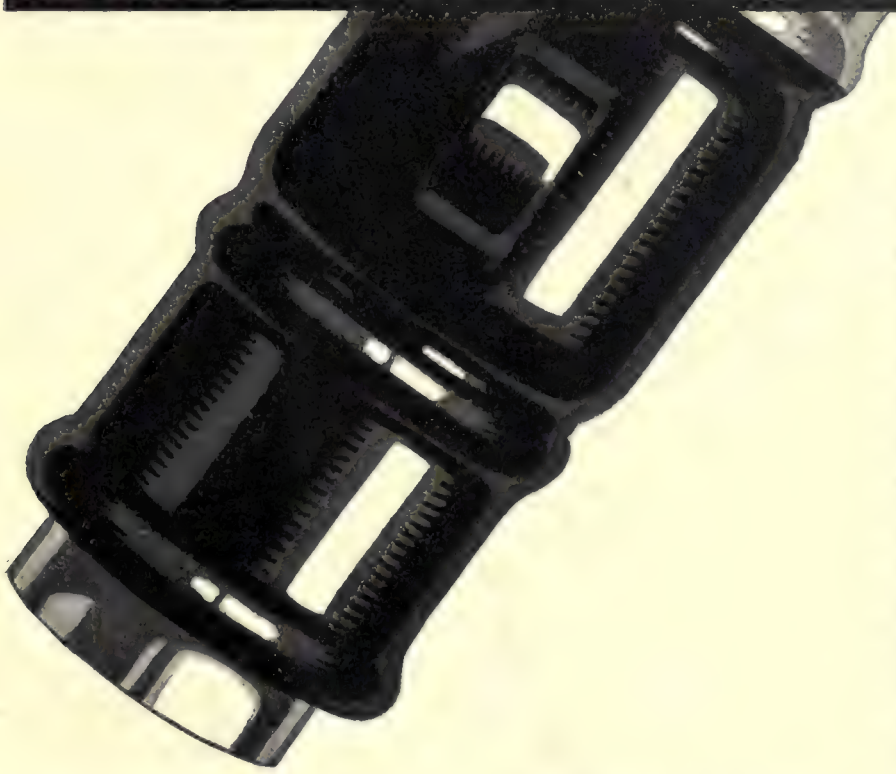
AIR—and air *alone* can absorb and thus practically eliminate road shocks and vibration.

These two destructive forces cost truck and bus operators who ignore them hundreds of thousands of dollars every year in unnecessary maintenance expense and repair bills——

GRÜSS
Sleeve Type
AIR SPRING

WESTINGHOUSE
Piston Type
AIR SPRING

THE SHOCK ELIMINATORS FOR TRUCKS-BUSSES-PASSENGER CARS

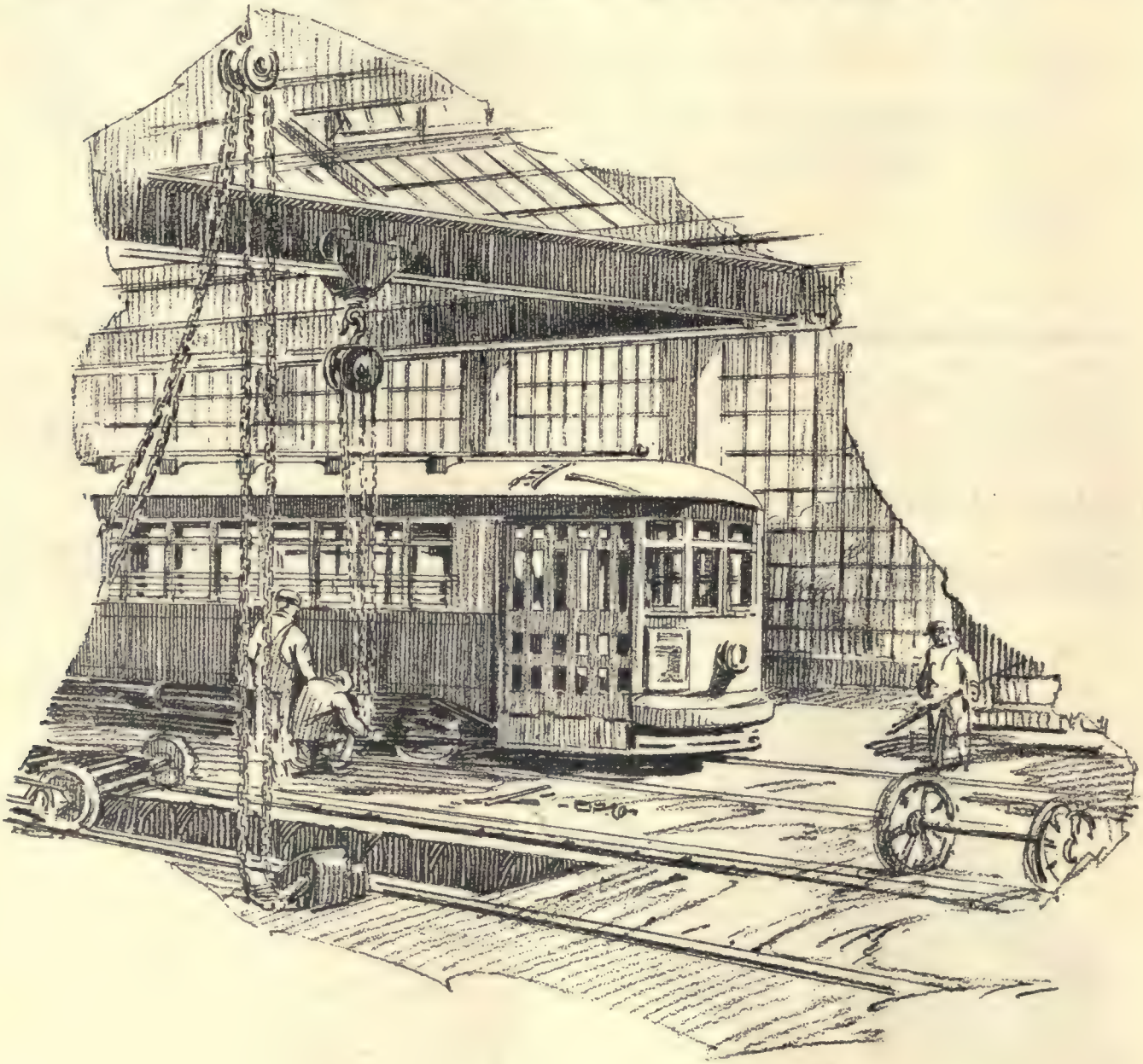


AIR Springs float the bus or truck chassis on cushions of air. These air cushions absorb road shocks and vibration, prevent twisting and wrenching of frame, eliminate shifting of load and damage to cargo, insure supreme riding comfort regardless of road conditions.

Thousands of truck and bus operators in all parts of the world have found the savings thus effected make air springs the greatest dividend payer they have in connection. with their equipment.

The CLEVELAND PNEUMATIC TOOL COMPANY
Cleveland, Ohio

# Maintenance—



# Car Card Almost

# our common responsibility

ELECTRIC railway maintenance costs have mounted higher and higher in the past decade. Likewise, it has taken an ever increasing proportion of the income derived from the use of car card advertising space to maintain *our* service up to the required standard.

**Barron G. Collier**
INCORPORATED
CANDLER BUILDING - NEW YORK

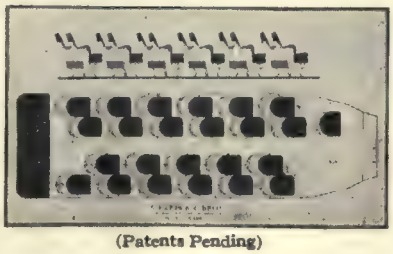
*Advertising Everywhere*

International Harvester Coach equipped with chairs designed and built by S. Karpen & Bros.

# Karpen chairs equip the most comfortable motor coaches

Comfort is the point of greatest distinction in modern motor coach construction. The traveling public, accustomed to the luxury of private motors, creates keen competition among operators by a demand for equal comfort in public coaches.

For nearly half a century Karpen has been designing and building high grade seating equipment for homes and public buildings; for steamships and railroad club and observation cars. And now this experience makes it a leader in the manufacture of chairs of various types for motor coach equipment.



(Patents Pending)

All Karpen coach chairs are built of indestructible fibre, with steel reinforcement in every upright stake. Climate and temperature have no effect on it. The Karpen "Staggard" seating method is the only arrangement which gives the comfort and privacy so much appreciated by passengers, without reducing the seating capacity.

All buyers of transportation seating equipment are cordially invited to consult our experts. Address Transportation Seating Department, General offices, Chicago.

Karpen FURNITURE

S. KARPEN & BROS.

*General Offices, 636-678 West 22nd Street*

CHICAGO

New York Salesroom
37th Street and Broadway

San Francisco Salesroom
180 New Montgomery Street

Chicago Salesroom
801-811 So. Wabash Avenue

# MEDIUM CAPACITY *and* DEPENDABLE

# Ruggedly Built for

The 21-Passenger Street Car Type is recognized as the unit of greatest utility. With Graham Brothers Motor Coaches of this type operators can give more frequent service. They haul fewer empty seats when traffic is light and they can operate more units to take care of traffic peaks.

Graham Brothers huge production makes initial cost low. Skillful design makes operating cost low. Rugged construction, which has made Graham Brothers dependability an accepted fact, keeps maintenance cost low.

# GRAHAM BROTHERS

SOLD BY DODGE BROTHERS

# Gruelling Service!

## *Graham Brothers Motor Coaches—Because of Fine Material, Skillful Workmanship and Correct Design — Are Sturdy and Dependable Without Excess Weight—*

Experience has taught motor coach operators that great size and great weight of equipment are not necessary. The trend continues towards the medium capacity coach.

Graham Brothers 21-Passenger street car type motor coaches are designed and built to meet the exacting conditions of motor coach operation. They are built ruggedly, powered adequately, designed for beauty and comfort—*and they stand up.*

Mile after mile, trip after trip, day after day, year after year—their performance is consistently dependable. Operators benefit by their low operating and maintenance costs with no sacrifice whatever in the power, stamina or reliability of their equipment.

There is invitation in the appearance of Graham Brothers coaches and that assurance of comfort and safety that fosters the coach-riding habit.

PRICES—*Standard 21-Passenger Street Car Type, complete, $3815; 12-Passenger Parlor Coach, complete, $3750; f. o. b. Detroit*

# MOTOR COACHES

DEALERS EVERYWHERE

# CONFIDENCE

Operators of Graham Brothers Motor Coaches enjoy a three-fold confidence — confidence in the equipment itself, confidence in the Dodge Brothers Dealer who sells and services it, confidence in the stability of Graham Brothers, a division of Dodge Brothers, Inc.

They know that their coaches are built of the finest materials by skilled workers to the specifications of engineers experienced in motor coach operation.

They know that the Dodge Brothers Dealer is a sound, substantial business man who will be right there where they bought their motor coaches whenever he is wanted — that he has trained mechanics and an adequate stock of repair parts.

They know that the reputation of Graham Brothers is behind their motor coaches — and that Graham Brothers reputation is a tremendous asset carefully guarded. These operators know, too, that the magnitude of Graham Brothers production made possible the exceptionally low price at which they were able to purchase their splendid equipment.

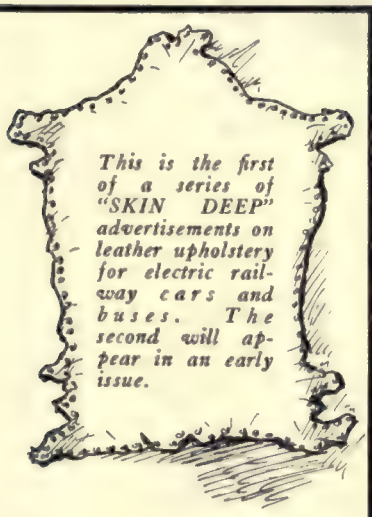
GRAHAM BROTHERS

EVANSVILLE — DETROIT — STOCKTON

A DIVISION OF DODGE BROTHERS, INC.

GRAHAM BROTHERS (CANADA) LIMITED, TORONTO, ONTARIO

# ECONOMY IS SKIN DEEP!




In the endeavor to decrease maintenance costs in transportation equipment the outside factors are too often put ahead of the inside factors. The inside of your cars or buses is what most concerns the passenger.

Cleveland Tanning Company Leather used in upholstering the seats of your cars or buses contributes directly to increased operating profits. It brings comfort and attractiveness to your passengers, and it costs less per mile in the long run. This opportunity to better your service and increase your profits—with lower maintenance costs—cannot be over-emphasized.

Supplied as complete hides, or cut to any pattern; five famous grades: Hyaline Grains, Alpha Grains, Hand Buffs, Machine Buffs and Special Machine Buffs. Color and finish according to your specifications. We will be pleased to send you samples.

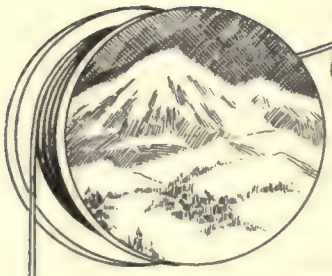
## NOTHING TAKES THE PLACE OF LEATHER

**HYALINE**

**The Cleveland Tanning Co.**
Dennison Ave. and Jennings Rd., Cleveland, O.

*Western Representatives:*
Midgeley & Borrowdale
McCormick Bldg., Chicago

*Eastern Representatives:*
Sisson Supply Co.,
1845 Grand Central Terminal, New York



Round the Country with

# Phono-Electric

## PHONO shows the hardiness of a Pioneer in world famous Salt Lake City

Little more than half a century ago Salt Lake City was the "half way house" in a vast desert; an outpost of the pioneers.

Today it is the commercial center of an immensely wealthy mining territory, and famous throughout the World for its scenic beauty.

The days of pioneer hardship and struggle are gone, but there's at least one monument to endurance in Salt Lake City, which bears a distinctly modern inscription.

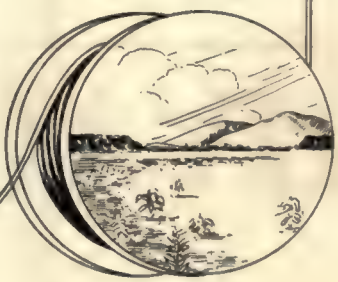
This is the Phono-Electric overhead, installed over Main Street in 1919, and still going strong after 2,300,000 car passes.

The wearing qualities of Phono and its practical immunity to wire breaks have been demonstrated again and again throughout America and in many parts of Europe. We believe you'll appreciate a plain statement of the technical reasons why, as given in the Phono Book. A copy will be mailed on request.

"Bridgeport" BRASS TRADE CO. MARK
Phono-Electric

Bridgeport Brass Company
BRIDGEPORT - CONNECTICUT

Trolley Wire



# Keeping upkeep down

In the racking strains of rough going, through the icy blasts of winter and under the scorching heat of summer, Fitzjohn bodies keep going, building patronage.

Such performance means just this. That Fitzjohn understands the problems confronted by the bus body builders and applies this knowledge in the design and production of quality bus bodies which stand up in service.

Sheer clean-cut beauty belies the enduring strength of Fitzjohn bodies. Thus has Fitzjohn combined revenue producing attractiveness with a construction inherently free from time loss for costly maintenance.

For pay-enter service or de luxe transportation, on any chassis, Fitzjohn offers low upkeep, profitable passenger miles.

Fitzjohn

FITZJOHN MANUFACTURING CO.
*Exclusive Bus Body Builders*
MUSKEGON, MICH.

# Put Railroad Brakes

AUTOMOTIVE vehicles have outgrown automotive braking. Two-wheel brakes have grown into four-wheel brakes. Ordinary brakes have been reinforced with power pressure—but you cannot get away from the fact that a brake is only as good as the friction which can be maintained between the drum and the brake shoe, and if this friction is nullified by the tremendous heats generated something has to be done about it.

That something has been discovered, as might be expected, by the company which stands in the forefront of railroad braking practice—The American Brake Shoe and Foundry Company—operating in the automotive field through its subsidiary—American Brake Materials Corporation.

The solution of the problem came not in larger drums; not in greater pressure; to all of which there are mechanical limitations. It came in applying the railroad principle of braking to automotive vehicles—dispensing with linings entirely and putting on in their place American Brakebloks, which are separate segments mounted on the brake head, allowing plenty of room between them for the vital essential—the quick dissipation of heat.

The whole solution depended upon the invention of the material itself—and you will find that this new material has the hardness of 35 carbon steel; will not score brake drums; acts equally well on hot or cold drums; is not affected by oil or water; and will not squeal.

# On Your Motor Buses!

Exhaustive tests have been made showing that this material outwears by three or four times any other friction material, that it makes possible the application of any desired pressure; and that it avoids the dissemination of heat to the tires which results in vulcanization and quick blow-outs.

American Brakebloks will be used on buses, passenger cars, trucks, and taxi cabs, and also on industrial machinery. They mean safety and economy.

Submit your problems to us; write for our circular which gives full information regarding this new discovery—"The Last Battle of the Momentum-Brake War."

**Here is shown an American Brakeblok assembly, also a demounted view showing bolted method of attachment of Brakebloks. Notice the separate segments allowing apertures for the rapid dissipation of heat.**

AMERICAN BRAKEBLOKS

## AMERICAN BRAKE MATERIALS CORPORATION
DETROIT

RAILROAD BRAKING PRACTICE APPLIED TO MOTOR CARS AND MACHINERY

AMERICAN BRAKEBLOKS

AMERICAN BRAKE MATERIALS CORPORATION, DETROIT
Subsidiary of
THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY

FLOOD LIGHT TOWERS

*View of the "Ideal Mile", Chicago South Shore and South Bend Ry., showing Bates "Semi-Fabricated" overhead structures. Photograph used through courtesy of the Ohio Brass Co., who furnished catenary material.*

CHANNEL POLES

# Bates Structures require minimum of maintenance

Original BATES Expanded Steel Pole

The development of the Bates Expanded Steel Pole gave the electrical industry a unique, simple, and highly desirable supporting unit which has found application in many locations the world over. Carrying the essential principle still further has brought forth the Bates "Double Expansion," making possible more complex structures which still embody the advantages of a minimum number of joints, thus eliminating the source of much deterioration, and making the matter of maintenance exceedingly simple.

*Bates Supporting Structures meet every requirement of the industry. Bates Facilities include a complete galvanizing plant. All Bates structures can be furnished galvanized if specified.*

***Let Bates Engineers submit estimates on your projected construction.***

BATES Double Expanded Steel Member

## *Bates Poles Outlive the Bond Issues That Buy Them*

INTERNATIONAL STANDARD ELECTRIC CORP.
*General Export Distributors*

SAMUEL BROWN, LTD., *New Zealand*
JOST ENGINEERING CO., LTD., *India*

BATES-TRUSS
Expanded
MADE ONLY BY

Bates Expanded Steel Truss Co.

*Sales, Engineering and Executive Offices*
EAST CHICAGO, INDIANA

*Atlas Flour Mill Fire at Milwaukee, Wis., Dec. 10, 1926*

A-711-LC

# Ask Your Fire Chief

**And he will tell you a story of engine endurance and continuously applied real horsepower that no bus or truck engine ever experiences. During the past year many fire pumpers have been built with Waukesha heavy duty six cylinder Bus and Truck engines. The Milwaukee Fire Department used the first one they built at the above fire and pumped 500,000 gallons of water at 165 pounds pressure during a continuous run of 15 hours and 30 minutes.**

*Paper horsepower soon fades when put to a test like this. Waukesha engines deliver real power and what is more can keep it up. The Ricardo Head, Girder Type Crankcase, "Truncated" Cylinders and huge three and a half inch crankshaft are a few of the reasons why these engines have never failed in a single twelve hour Underwriters Fire Pumper test. They are built in sizes from 70 to 130 Horsepower. If interested—Send for complete literature.*

(A-719-LC)

AUTOMOTIVE EQUIPMENT DIVISION

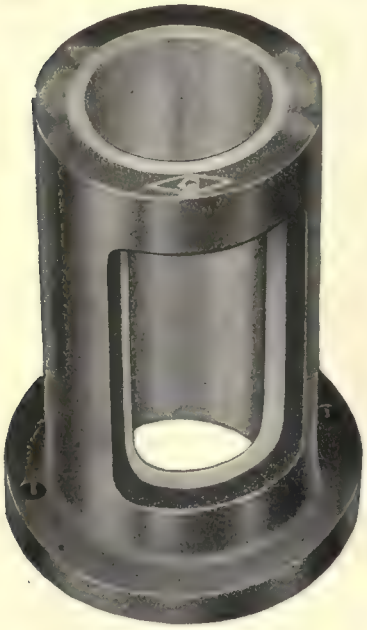
**WAUKESHA MOTOR COMPANY**

**Waukesha Wisconsin**

*Eastern Sales Offices Aeolian Building, 33 W. 42nd Street New York City*

*Exclusive Builders of Heavy Duty Automotive Type Engines for Over Twenty Years*

# Gilbert's Electric Railway products for Economy



## Armature Bearings

Gilbert Velox Bronze Armature Bearings for Street Car Motors. Made up in Solid Bronze or lined with "C" Grade Nickel Babbitt. Tests show exceptionally high car mileage. Far superior to anything in the way of a bearing on the market today.

Gilbert "C" Grade Nickel Metal is a tin base metal with nickel, antimony, and copper and is by far the most dependable metal for use under heavy loads and excessive vibration.

THE Gilbert Organization has for years given its complete time and thought to the economical operation of electric cars. Specializing in certain equipment for motors, axles, etc., and for the overhead line, the Gilbert Organization has contributed in a large way to minimizing car maintenance and increasing service efficiency. An increasing demand for Gilbert Specialties fully demonstrates the great appreciation that exists everywhere for Gilbert quality.

## Quality Babbitts

Developed by specialists and made of virgin metals—the positive assurance of a superior bearing metal. Maximum service is resulting wherever Gilbert Babbitts are used.

The metallic compositions of Gilbert's Quality Babbitts—Street Car Armature, axle, and Journal Bearings — Trolley Wheels and Harps—were made our standards after 26 years of engineering and metallurgical experimentation.

Actual tests in every case were conducted to prove the superiority of the various compositions. All this was done with the users viewpoint always the foremost consideration.

## Journal Bearing and Check Plates

Made for all types of trucks. Journal Bearings made in VELOX. Check Plates manufactured of Gilbert PHOSPHOR BRONZE.

## Axle Bearings in Velox Bronze

Maximum mileage and satisfactory service in Gilbert Axle Bearings results because bearing alloys used have been proven highest quality thru experimentation. We have developed a means whereby we manufacture axle bearings in exact halves, with the metal equally distributed in both the upper and lower half—accurately finished with as true a fit as is possible.

**A. GILBERT & SONS BRASS FOUNDRY CO.**

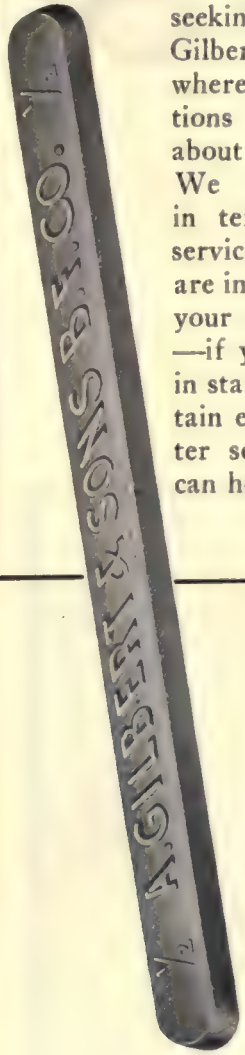
ST. LOUIS, U. S. A.

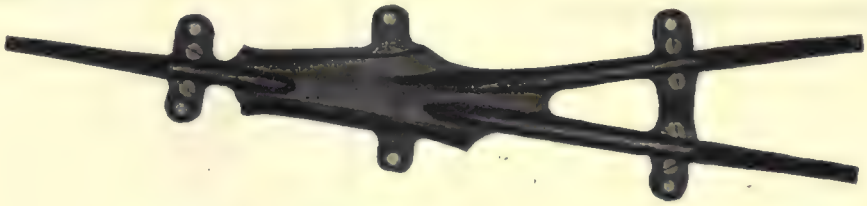
# The name Gilbert on Electric Railway products means Service

THE Gilbert plant is equipped with all the latest and up-to-date equipment for correct and uniform production. Our testing laboratories are continually seeking to even better Gilbert developments where service conditions change and bring about new demands. We continually think in terms of customer service economy. If you are interested in cutting your maintenance costs —if you are interested in standardizing on certain equipment for better service results, we can help you.

## Trolley Wheels and Harps

In purchasing trolley wheels consider seriously these three points—(1) Conductivity, (2) Wear on over-head lines, and (3) Car Mileage. Our engineers long ago experimented with these three points of prime consideration. (1) With proper facts our metallurgical and engineering departments developed an alloy manufactured under a chemical process that retains original copper conductivity and gives the maximum in mileage. (2) The composition used means minimum wear on over-head lines. (3) Gilbert Trolley Wheels are giving exceptional mileage in various services.



## Gilbert Replaceable Ear Frogs

Made in 8 to 20 degree angles and with replaceable ears. For all wires.

## Gilbert Trolley Ears

Gilbert line material is all designed and made to be most efficient. The Clinch Trolley Ear shown below conforms to A-R-E-A specifications. Lengths, 9, 12, 15 inch, 5/8 boss.

## Gilbert's Solders

All our solders are made from pure straits tin and double refined lead thoroughly refined and purified.

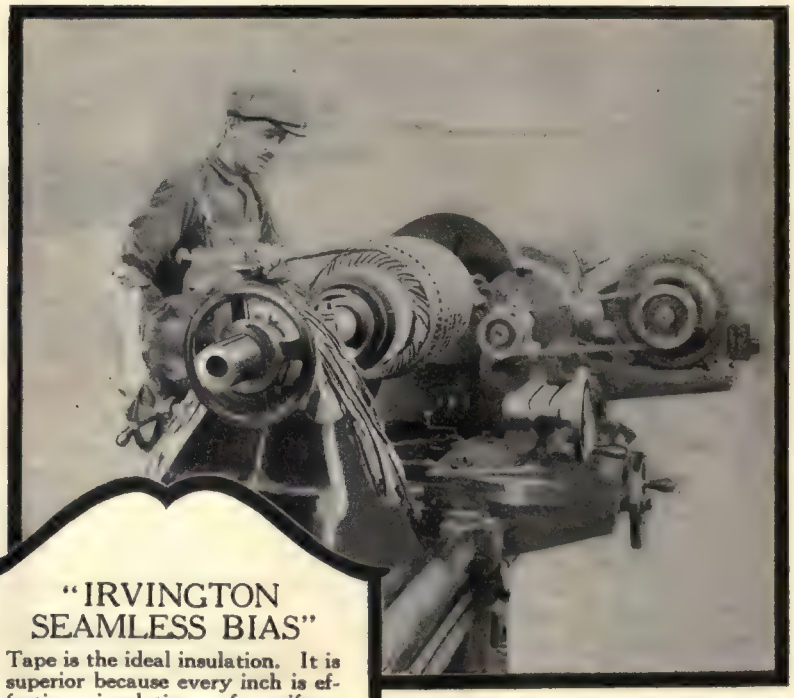
**A. GILBERT & SONS BRASS FOUNDRY CO.**

ST. LOUIS, U. S. A.

Agua

## "IRV-O-SLOT"

is the most economical and convenient type of insulation for armature slots. It is a varnished cambric insulation duplexed with any standard thickness of fibrous insulation. The materials are cemented with a flexible binder that permits shaping without separation of the layers. It is supplied in sheets or strips or cut to slot sizes. Saves both labor and material and simplifies the winding job.



## "IRVINGTON SEAMLESS BIAS"

Tape is the ideal insulation. It is superior because every inch is effective insulation of uniform thickness. It gives smooth windings, requires a minimum of impregnating varnish, and eliminates air pockets. It can be applied with taping machines. Furnished in yellow and black .005 to .015 in. thick; ½ in. to 36 in. wide on paper cores 3/8 to 1½ in. hole, with standard rolls of 36 and 72 lineal yards.

# rantee of long life

# IRVINGTON INSULATION

IRVINGTON INSULATING VARNISHES designed for the requirements of specific apparatus are now offered to the electrical industry. This product is backed by twenty years' leadership in the field of varnished insulation. For the electric railways a varnish particularly suited to the type of motor, varnishing equipment and regional climatic changes can be supplied. *Write for Catalog* 101-*V*.

*Many reasons for its Superiority*

The experience and background of this company guarantees the user of Irvington Insulation that everything possible has been done to make its products thoroughly reliable. The company has devoted 22 years solely to the manufacture of varnished insulation.

*Complete Control of all Processes.*

Irvington has the only plant independent of all except raw material markets. A complete unit devoted exclusively to finishing cloth suitably for varnished insulations.

*A Thoroughly Fireproofed Plant*

Designed in units to assure you a continuous source of supply.

*Laboratory Control of Processes*

Including chemical, electrical and physical inspection of all products, maintenance of test standards and research to assure constant improvement.

*Capacity*

Sufficient productive capacity to meet emergency demands and insure prompt delivery.

*Result—BALANCED INSULATION*

In which every *necessary quality* is present at a *maximum value* without detriment to any other *fundamental requirement.*

IRVINGTON PRODUCTS

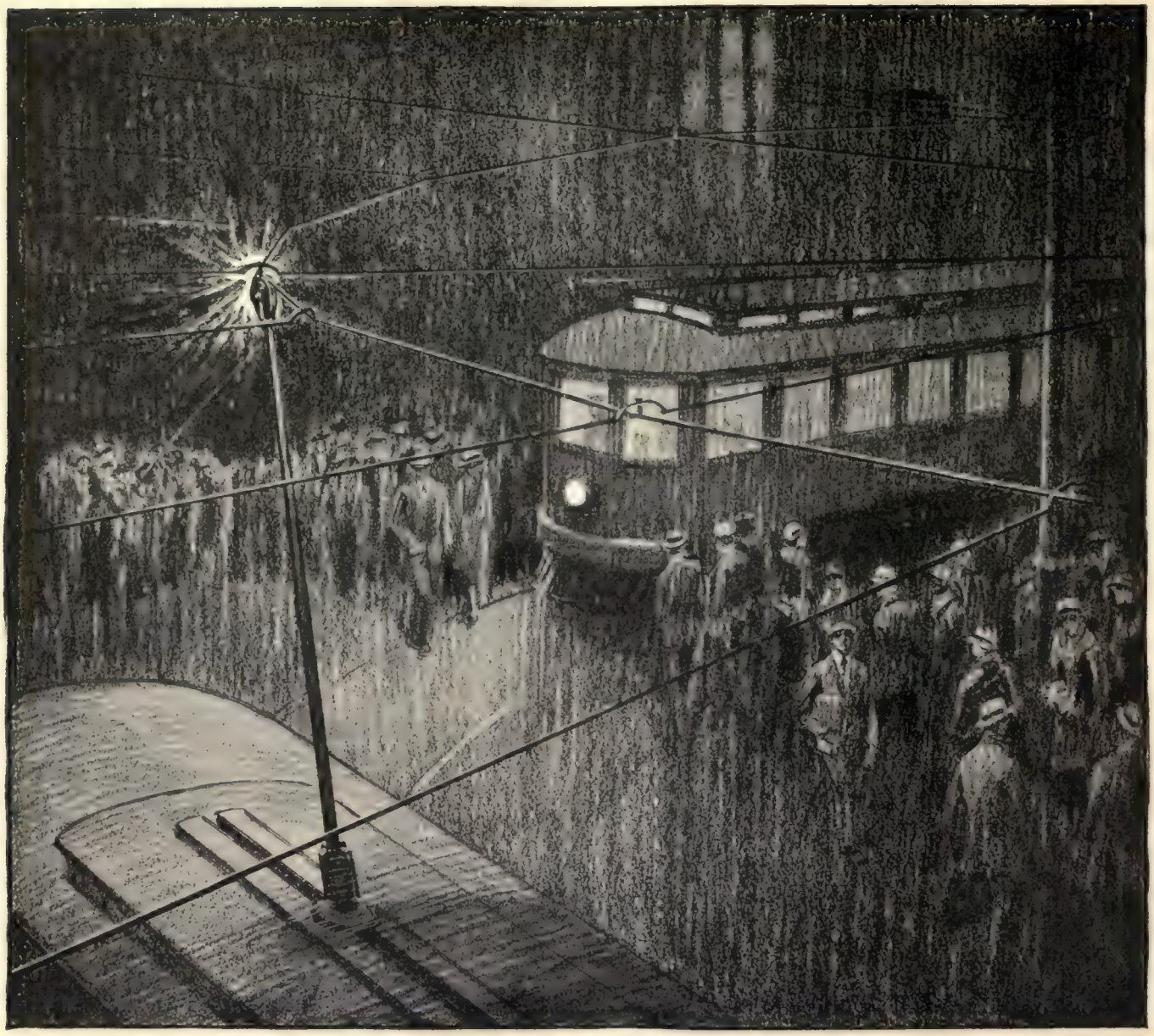
Varnished Silk
Varnished Paper
Black and Yellow Varnished Cambric
Straight and Bias Varnished Cambric Tapes
Flexible Varnished Tubing
Transformer Leads
"Cellulak"
Insulating Varnishes and Compounds
"Irv-O-Slot" Insulation
Paper Form Wound Coil Windings.

IRVINGTON VARNISH & INSULATOR CO.
Irvington, New Jersey.
*Established* 1905

***Sales Representatives:***

Mitchell-Rand Mfg. Co., New York
White Supply Co., St. Louis
E. M. Wolcott, Rochester
Martin Woodard, Seattle
Prehler Bros., Chicago
Consumers Rubber Co., Cleveland
Clapp & La Moree, Los Angeles
A. L. Gillies, Toronto

IRVINGTON INSULATION



# Hitenso for Strength

STRENGTH—a minimum of 79,000 pounds per square inch, for 00 size—with the least sacrifice in conductivity is available only in Hitenso.

Hitenso "C" meets the strength requirements of the A.S.T.M. specifications for High Strength Bronze and exceeds the conductivity by 15%. Hitenso "A" meets the specifications for Medium Strength Bronze and exceeds the conductivity by 15%. In terms of electrical efficiency Hitenso "C" is 37½% better than High Strength Bronze and Hitenso "A" 23% better than Medium Strength Bronze.

Where operating conditions are severe, Hitenso Trolley Wire, exclusively an Anaconda Product, serves best. Complete information upon request.

ANACONDA COPPER MINING CO. THE AMERICAN BRASS COMPANY
*Rod, Wire and Cable Products*
General Offices: 25 Broadway, New York Chicago Office: 111 W. Washington St.

# ANACONDA TROLLEY WIRE

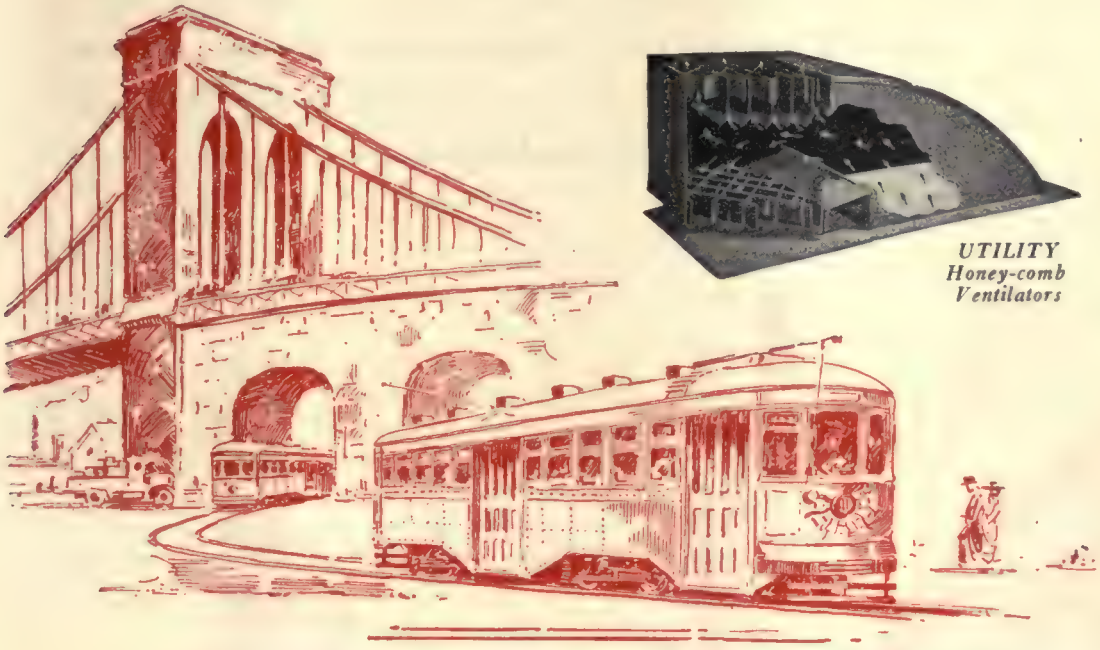
# Business Builders

**Utility Regulators** are positive in action and maintain a uniform temperature within the car.

Proper Heating and Ventilating is a business building asset for any Electric Railway.

Utility car heating and ventilating devices represent the farthest advance made in this line of endeavor. Utility Heaters now employ only genuine Chromalox elements, which can be operated up to 1,400 degrees without the slightest risk of danger or deterioration. They are proof against vibration, overloads, dust, dirt, or moisture, the heaters are so constructed that they can be installed on combustible parts of the car body just as received from the factory, without additional insulating materials of any kind. No shields are required to protect clothing or seats. All Utility Heaters carry the fire underwriters' label.

Utility car Heating and Ventilating Devices are standard equipment for many railroad properties. If you are not using them it will be to your advantage to get detailed information.





*UTILITY Honey-comb Ventilators*

*UTILITY Vestibule Heater*

**Chromalox Strip Heaters**
An Indestructible Electric Heating Unit which is made in various sizes so that it can be installed for replacement in all types of old or new heater cases.

Car Comfort with Utility Heaters Regulators Ventilators

RAILWAY UTILITY COMPANY

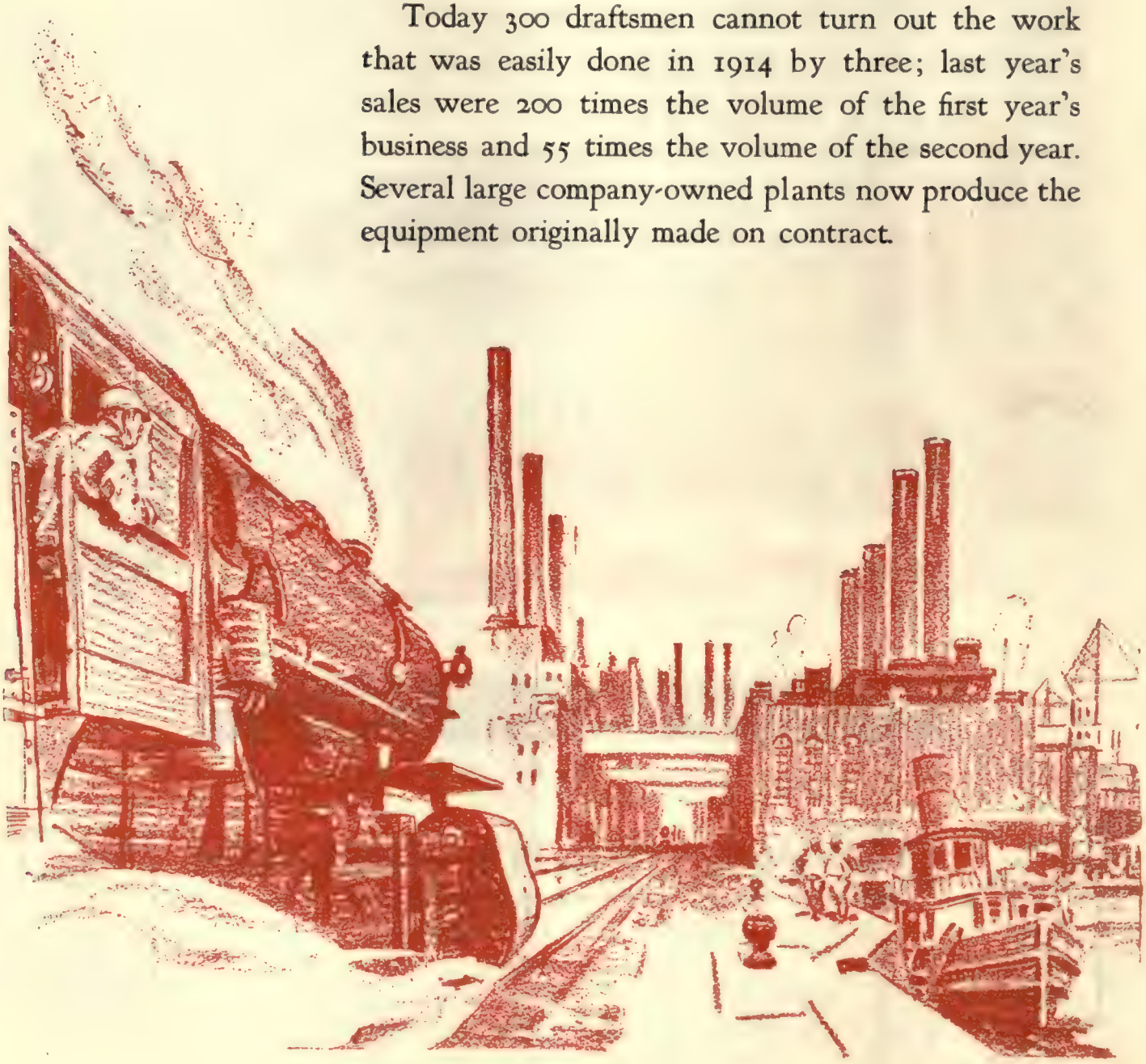
CHICAGO, ILLINOIS

Car Comfort with Utility Heaters Regulators Ventilators

# Speeding Industrial

IT seems only yesterday that they were starting out—this engineering equipment corporation that today dominates the field.

Today 300 draftsmen cannot turn out the work that was easily done in 1914 by three; last year's sales were 200 times the volume of the first year's business and 55 times the volume of the second year. Several large company-owned plants now produce the equipment originally made on contract.



# the Way to Prestige and Profits

STARTING from scratch—a new name, without prestige—to a position of absolute dominance within a single decade. This actual case is another of those examples of conspicuous achievement which color the pages of American industrial history.

How was it accomplished?

The answer is good products, good engineers and—a sound industrial marketing and advertising procedure in which, according to an officer of the corporation, McGraw-Hill Publications were a major factor.

This Industrial Advertising persistently campaigned for lower operating costs through use of the advertised equipment. Not for the day, but for three years—five years ahead the advertising aimed for business. The pace the advertising set 12 years ago was always increased—never slackened.

And now, having conquered the market, this Industrial Seller depends upon Industrial Advertising for a still more important purpose—to keep command of his leadership. His confidence in Industrial Advertising and his knowledge of Industry's trends are best evidenced by plans to handle a doubled volume of business in 1927.

The case cited shows how Industrial Advertising, based on marketing knowledge, is the direct and effective approach to the Industrial Buyer's interest.

Granting all honor to the leaders who attribute their standing to Age, no Industrial seller wants to wait for Time alone to ripen his prestige. What this manufacturer did is possible for other manufacturers to do, for the basic fundamentals of industrial recognition are charted in the McGraw-Hill Four Principles of Industrial Marketing.

1. Determination of worthwhile markets.
2. Analysis of their buying habits.
3. Determination of direct channels of approach.
4. Study of effective sales appeals.

IN either preliminary or advanced consideration of Industrial Marketing and Advertising problems and possibilities, the complete facilities of the McGraw-Hill organization are available to any Industrial Seller or his advertising agency. Each McGraw-Hill office is fully equipped to serve.

*"Industrial Marketing at Work" is a new book soon to be published. It shows how to make a step-by-step application of the McGraw-Hill Four Principles of Industrial Marketing. If Industry is your customer this book will help establish your advertising and selling on a foundation of certainty. You may request the nearest McGraw-Hill office to deliver a copy as soon as it is off the press.*

McGRAW-HILL PUBLISHING COMPANY, INC., NEW YORK, CHICAGO, PHILADELPHIA, CLEVELAND, ST. LOUIS, SAN FRANCISCO, LONDON. PUBLISHERS OF

# McGRAW-HILL PUBLICATIONS

45,000 ADVERTISING PAGES USED ANNUALLY BY 3,000 MANUFACTURERS TO HELP INDUSTRY BUY MORE EFFECTIVELY

CONSTRUCTION & CIVIL ENGINEERING
ENGINEERING NEWS-RECORD
SUCCESSFUL CONSTRUCTION METHODS

ELECTRICAL
ELECTRICAL WORLD ELECTRICAL WEST
ELECTRICAL MERCHANDISING

INDUSTRIAL
AMERICAN MACHINIST INDUSTRIAL ENGINEER
CHEMICAL & METALLURGICAL ENGINEERING
POWER

TRANSPORTATION
ELECTRIC RAILWAY JOURNAL
BUS TRANSPORTATION

RADIO
RADIO RETAILING

MINING
ENGINEERING & MINING JOURNAL
COAL AGE

OVERSEAS
INGENIERA INTERNACIONAL
AMERICAN MACHINIST
(EUROPEAN EDITION)

CATALOGS & DIRECTORIES
ELECTRICAL TRADE CATALOG
ELECTRICAL ENGINEERING CATALOG
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KEYSTONE COAL MINING CATALOG KEYSTONE CATALOG (METAL-QUARRY EDITION)
KEYSTONE COAL BUYERS CATALOG
CENTRAL STATION DIRECTORY
ELECTRIC RAILWAY DIRECTORY
COAL FIELD DIRECTORY
ANALYSIS OF METALLIC AND NON-METALLIC MINING, QUARRYING AND CEMENT INDUSTRIES

# ALUMINUM

## *in the Electric Railway Field*

*Canadian National Railways use 477,000 c.m. A.C.S.R. for combined Messenger-Feeder.*

# A.C.S.R.

## *as*

## *Catenary Messenger*

ALUMINUM cable, with a core of stranded high strength steel wires, combines the functions of Messenger and Feeder most economically, for it is non-corrodible, and at the same time has the mechanical advantages of high grade steel. The minimums of supported weight and resulting stresses are obtained by the use of aluminum conductors and fittings.

ALUMINUM COMPANY OF AMERICA
2301 Oliver Building, Pittsburgh, Penn.

Strong Aluminum Alloys for car construction are for use in the modern light-weight car. These alloys combine the strength of mild steel with the lightness of aluminum; they are furnished in sheet, conduit, pipe, castings, etc. A booklet describing them will be sent free on request.

Long distances offer no discomforts to the Bus traveler—when the body is by Lang

LB

The Sterling Mark on Bus Bodies

# LANG BODIES

## *create new passengers*

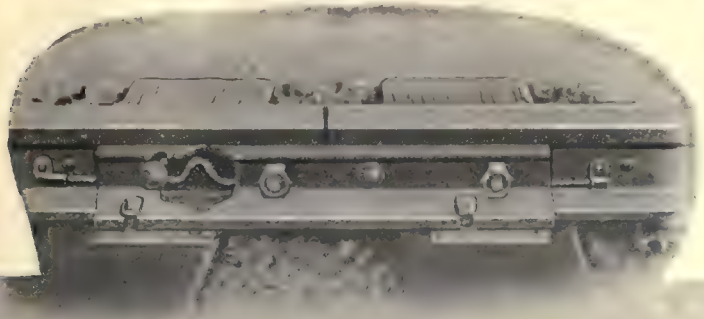
Lang Bodies invite relaxation. Relaxation means comfort. Comfort means a pleasant trip and miles that seem shorter when the distance is long.

Deep-cushioned seats, clear vision, ample leg-room; these and many other carefully studied features contributing to passenger comfort create new passengers —and hold them.

THE LANG BODY COMPANY
CLEVELAND, OHIO

*"After all— it's the Setting that counts!"*

# PIN TERMINAL RAIL BONDS



*Showing installation of Pin Terminal Rail Bond: Two 1/0 bonds per joint. Each bond has a separate socket terminal soldered to stub end of bond after threading behind and without removing the slice bars.*

*View of the Virginian Railway Company power house on the New River, Narrows, Virginia.*

American Steel & Wire Company's Pin Terminal Rail Bonds were used throughout on the Roanoke Mullens Electrification of the Virginian Railway.

As all of the bonding had to be done under traffic it was necessary to have a protected type of bond which could be installed without removing the splice bars. It was only after careful study by the engineers that they specified Pin Terminal Rail Bonds.

This type of bond is easy to install, accessible for inspection, and can be replaced readily in case of rail breaks or wrecks.

American Steel & Wire Company's extra high strength Galvanized Steel Strand was used throughout for guying the catenary structures and for cross catenary messengers. Our Multiple Conductor Control Cables and Varnished Cambric Insulated Cables also were used in the power house and shops.

MADE BY

## American Steel & Wire Company

SALES OFFICES:

CHICAGO, NEW YORK, BOSTON, CLEVELAND, WORCESTER, PHILADELPHIA, PITTSBURGH, BUFFALO, DETROIT, CINCINNATI, BALTIMORE, WILKES-BARRE, ST. LOUIS, KANSAS CITY, ST. PAUL, OKLAHOMA CITY, BIRMINGHAM, MEMPHIS, DALLAS, ATLANTA, DENVER, SALT LAKE CITY

Export Representatives: U. S. Steel Products Co., New York. Pacific Coast Representative. U S Steel Products Co., San Francisco, Los Angeles, Portland, Seattle.

26947

ADAPTABLE
For Every Class of Service
International Creosoted Pine Poles are used in every class of service—for the small rural telephone line, for city distribution and for the giant cross country transmission system.
They possess to a greater degree every characteristic required for reliable and economical pole service — greatest strength, longest life, decay proof, insect proof, straightness, smoothness and lowest cost.
When you specify International poles, you are assured of sound timber, expert manufacture and scientific treatment. Each pole is backed by an institution with 50 years of experience and a policy that stands for the best in timber preservation. International has poles in service for 28 years which are still perfectly sound.
Illustration shows International Creosoted Pine Poles in business section of Miami, Oklahoma, in service of Southwestern Bell Telephone Co.
International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont
2¢7
The International Dating Nail
International
Creosoted Yellow Pine Poles

# Cheaper Maintenance With Air Power

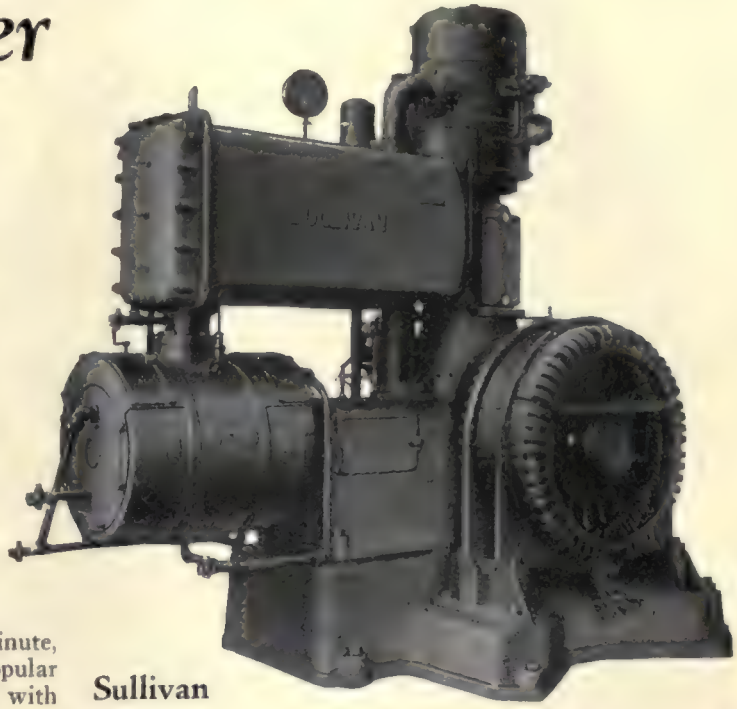
The economy and versatility of air power have made it popular for the maintenance work of Electric Railway properties. Shop after shop is increasing its use of air, for operating air tools, testing brakes, cleaning, painting, and for operating gas furnaces; and many compressors 1500-cu.-ft. and even larger are being installed.

If your air requirements are greater than 400 cu. ft. you can take advantage of the important economies embodied in Sullivan Angle Compound Compressors. The balanced angle design of these machines saves floor space and foundations, and enables the compressor to run at full speed with no perceptible vibration.

Multi-step load control saves power. "Wafer" valves, positive automatic lubrication, and adaptability to any drive, are other features.

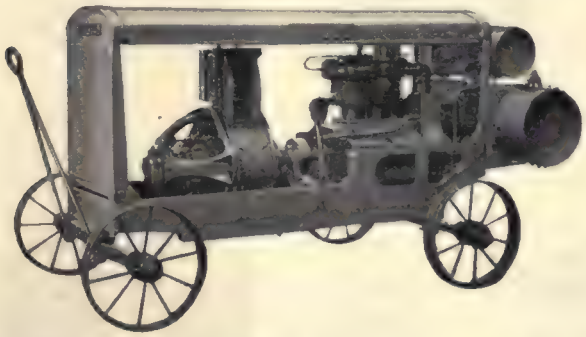
Capacities are 400 to 3700 cu. ft. For full information write for Catalog 3283-A.

For shops requiring from 68 to 500 cu. ft. of air per minute, the Sullivan single stage "WG-6" compressor is a popular machine. It is rugged and compact, and is equipped with "sweep control" unloading system, "Wafer" valves, and automatic lubrication. For full information, write for Catalog 3283-B.



**Sullivan Balanced Angle Compound Compressor, direct driven from electric motor**

## Sullivan Portable Compressors



For repair work out on the tracks, where electric power is readily available, the right compressor for you is the Sullivan electric portable. You can get it in 103 and 206 cu. ft. capacities, mounted on steel wheels, rubber-tired trailer trucks, skids, or on your own truck or car. Motors are of standard make, carefully tested. The 103-ft. compressor will run two concrete breakers, 2 tampers, 4 riveters, 4 clay diggers, or a rock drill. Write for Catalog 3283-E.

Sullivan Portable Compressors run by Buda engines are also available. *See Catalog 3283-D.*

## Sullivan Electric Portable Hoists

A compact, automatically lubricated little hoist that will lift a ton on single line, or pull a 50-ton car on level track. Electric and Turbinair models are available in single and two-drum models. *Write for Catalog 3276-G.*

## Sullivan Concrete Breakers

Sullivan Busters successfully meet the wide and increasing demand for a one-man compressed air tool that will do quickly and cheaply such work as breaking concrete pavements and cutting asphalt in repairing track. They are available in 48-lb. and 75-lb. models. *Catalog 3281-I.*

Heavy "Buster"

## Sullivan Clay Spaders

Sullivan Clay Spaders will cut your labor on clay digging jobs in half. Why use the pick and shovel when only a Spader is needed? *Get Catalog 3281-J.*

"Spader"

## Sullivan "Rotator" Rock Drills

Sullivan Rotators are fast rock drillers under any conditions. Seven models are available, including augur and steam models. *Get Catalog 3281-F.*

**SULLIVAN MACHINERY COMPANY**

**150 SOUTH MICHIGAN AVE., CHICAGO, ILLINOIS U.S.A.**

# Lower

**More-Jones Trolley Wheels**

They are finished complete in one operation, thus insuring proper balance.

The metal used is exceedingly tough—an alloy of purest new metal, having maximum conductivity—which provides greater mileage without damage to the overhead lines.

V-K Oil-less Wheels for City and Suburban service and More-Jones lubricated Wheels for high speed requirements insure lowest ultimate cost.

# *More than 50*

# Operating Costs—Better Service

## Equipment of uncertain quality becomes a barrier to economical traction system operation.

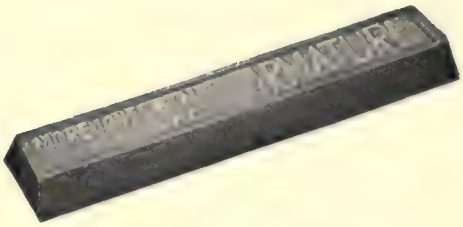
This organization has, for more than a quarter of a century, given traction problems careful study and knows the quality of equipment necessary for the growing needs of modern car operation.

More-Jones Quality Products cut down maintenance requirements, and make better service possible. Net earnings show the value of More-Jones Quality Products. Uniformity is one of the outstanding features of these products.

Let us give you further information and prices.

Prompt shipments always.

**More-Jones Brass & Metal Co.**
St. Louis, Mo.



**More-Jones ARMATURE Babbitt Metal**

Standard on the majority of Electric Railway Systems in this country.

Specially formulated for the exacting requirement of Electric Railway Armature Bearing maintenance.

Its high heat radiation minimizes friction, even under the most trying circumstances.

A trial is the most conclusive proof of its superior inherent characteristics.

**"Tiger" Bronze Axle and Armature Bearings**

The Lead content, that we scientifically incorporate into this alloy, minimizes frictional wear, resulting in less frequent replacements. Finished oversize or undersize to a perfect running fit with your shafts.

Expertly machined in strict accordance with your specifications, even to the extent of incorporating special features therein, if so desired.

All Armature Bearings lined with our celebrated ARMATURE Babbitt Metal.

"Tiger" Bronze Axle and Armature Bearings insure maximum service under the hardest operating conditions.

# MORE-JONES QUALITY PRODUCTS

# years of Service

# Only 100 creosoted pine poles down in storm-58,700 others

IN the unprecedented sleet storm of December, 1924, pole lines were given a strength test seldom equalled, throughout the territory from southern Michigan to Texas. In Illinois alone one company lost over 23,000 untreated poles, and not one creosoted pine pole failed. Over 28,000 poles were lost in Missouri, 3,200 in Oklahoma, 1,000 in Texas, etc., totalling 58,700.

The Illinois Bell Telephone Company alone used 37,000 creosoted pine poles for replacement after this storm.*

Amcreco Creosoted Southern Yellow Pine Poles are not only stronger than other wooden poles, but they have demonstrated their ability to resist decay for 25 to 40 years.

**AMERICAN CREOSOTING COMPANY**

INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED

AMCRECO LOWRY PROCESS CREOSOTED WOOD

GEORGIA CREOSOTING COMPANY INCORPORATED

LOUISVILLE ~ KENTUCKY

*SALES OFFICES*

332 So. Michigan Ave. Chicago

350 Madison Ave. New York City

Brunswick, Ga.

401 W. Main St. Louisville, Ky.

Bogalusa, La.

* See report of Committee on Wood Preservation A.R.E.A. 1926, page 98.

ERJ3-19Gray

# Creosoted pine ties in good condition--- after 31 years!

CREOSOTED ties are standard on most leading steam roads as a result of many years' experience with such ties, proving conclusively the economy resulting.

The records of electric railway experience with creosoted ties are not yet so exhaustive but such records as are available indicate clearly that the saving is just as important for an electric railway as a steam. For example, the Georgia Railway and Power Company reports creosoted pine ties in good condition after 31 years of service, part of the time in open track and later repaved.*

Amcreco Creosoted Southern Yellow Pine Ties offer the highest available standard of tie economy. Not only do they reduce maintenance charges by cutting the number of tie renewals per year but they greatly reduce expense for tearing up pavement to replace defective ties.

**AMERICAN CREOSOTING COMPANY**
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED

AMCRECO LOWRY PROCESS CREOSOTED WOOD

GEORGIA CREOSOTING COMPANY INCORPORATED

LOUISVILLE ~ KENTUCKY

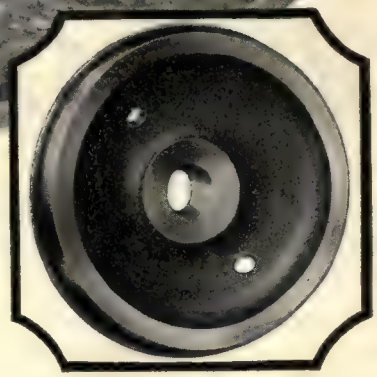
*SALES OFFICES*

332 So. Michigan Ave. Chicago — 350 Madison Ave. New York City

Brunswick, Ga. — 401 W. Main St. Louisville, Ky. — Bogalusa, La.

* See report of Committee on Wood Preservation A.R.E.A. 1926, page 98.

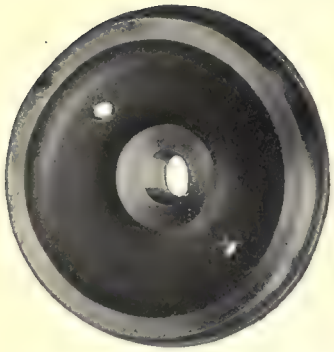
Birds-Eye View of Cambria Wheel Plan

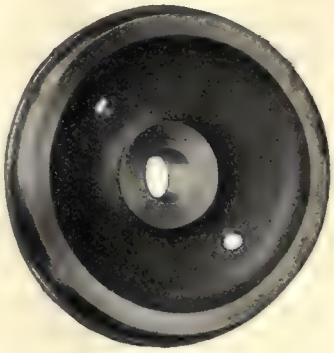


# CAMBRIA
## Rolled Steel Wheels and Forged Steel Axles

CAMBRIA Rolled Steel Wheels and Forged Steel Axles for Electric Railway Service insure the maximum mileage and safety.

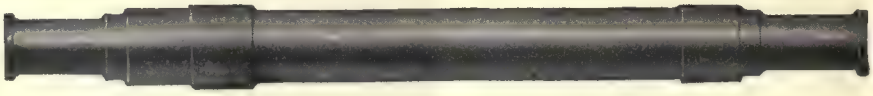
A combined forging and rolling process is followed in the manufacture of Cambria Wheels. The forging imparts to the metal strength, toughness and density. The rolling establishes a grained structure in the metal, preventing breakage and crystallization.





The finest selected stock is used in the manufacture of Cambria Forged Steel Axles. They can be supplied rough-turned all over, heat treated, annealed or untreated.

Complete control of every process of manufacture— from ore to finished product— and wide manufacturing experience enable Bethlehem to maintain the splendid quality and wearability of Cambria Wheels and Axles.



BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

*District Offices:* New York, Cleveland, Boston, Cincinnati, Philadelphia, Detroit, Baltimore, Chicago, Washington, St. Louis, Atlanta, San Francisco, Pittsburgh, Los Angeles, Buffalo, Seattle, Portland

Bethlehem Steel Export Corporation, Broadway, 25 New York City, *Sole Exporter of our Commercial Products*

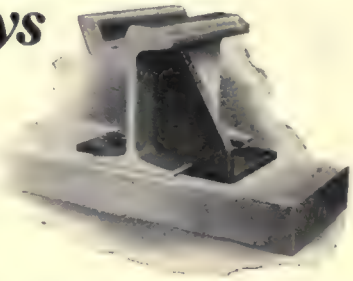
# BETHLEHEM

# Bethlehem Track Specialties
## *for Electric Railways*

*Special Welding Plate, Design 407-B*

Special Trackwork; Tee and Girder Rails; Special Splice Bars for Welding; Machine Fitted Joints; Abbott and Center Rib Base Plates; Tie Rods; Bolts; Pole Line Material; Rolled Steel Wheels and Forged Axles.

*Catalog Sent Upon Request*



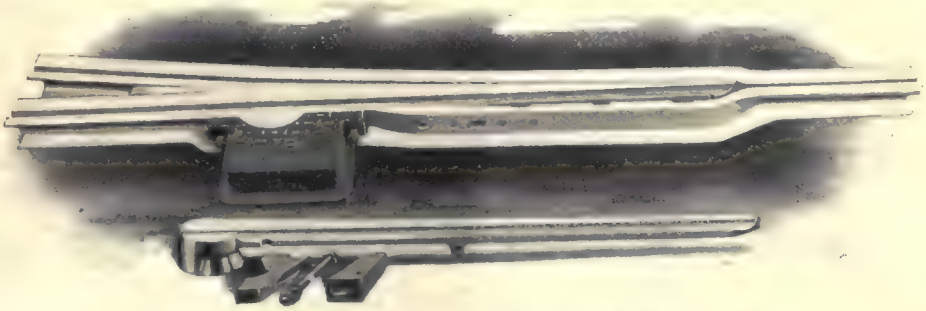
*Brace Tie Plate, Design 804*

*Center Rib Base Plate*

SPECIAL TRACKWORK AND LAYOUTS

*Below: Solid Manganese Tongue Switch, Design 905*

*Abbott Base Plate*



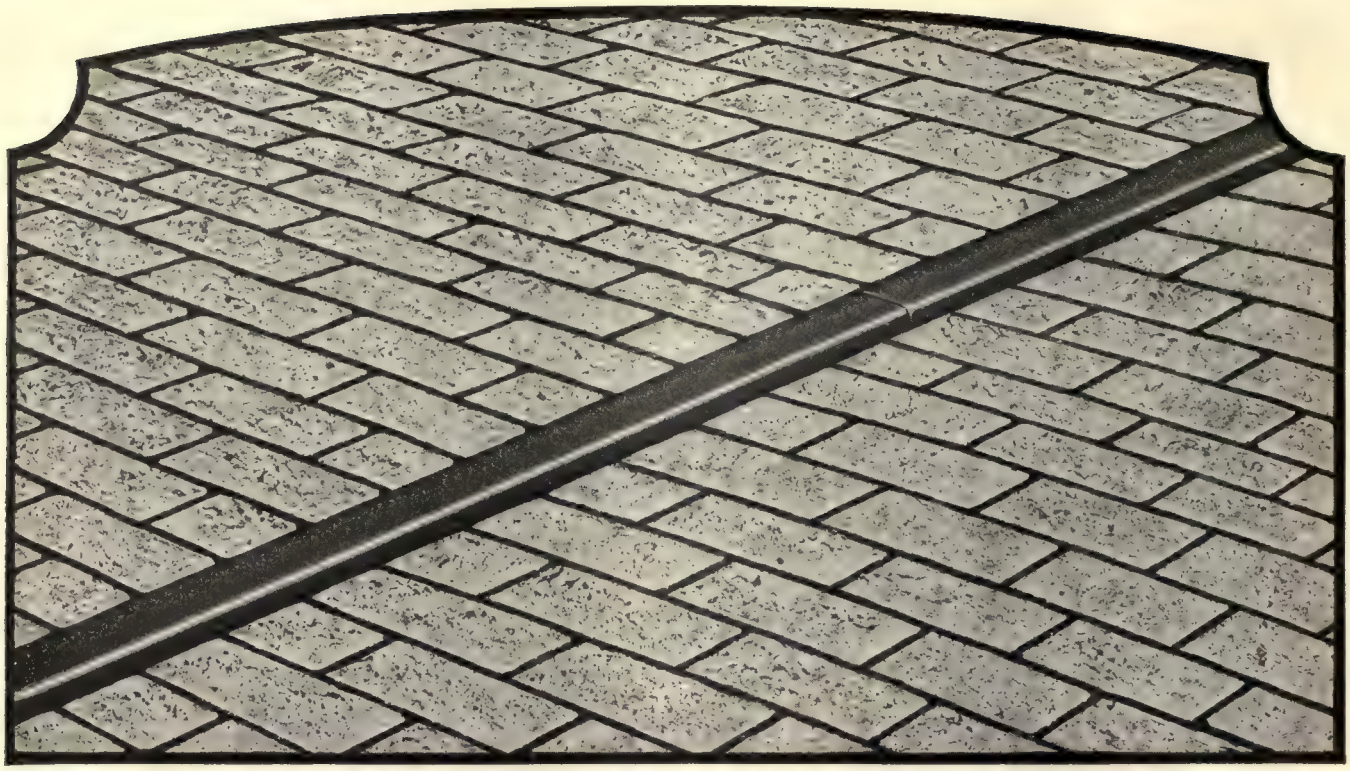
BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

DISTRICT OFFICES:

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh Buffalo Cleveland
Detroit Cincinnati Chicago St. Louis San Francisco Seattle Los Angeles Portland

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

# BETHLEHEM



# 2½ inch brick means enduring pavements at less cost

THE exhaustive government-made test at Arlington establishes beyond all question the complete adequacy of *thin brick pavements* under the most rigorous of modern traffic conditions.

The Six-Point-Service of Vitrified Brick can now be yours at materially lower first cost.

*Let us send you a complete reprint of the official government report containing detailed performance figures.*

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION
ENGINEERS BUILDING CLEVELAND, OHIO

VITRIFIED Brick

6 point service

1 absorbs impact at rail joints

2 water-seals road-bed and ties

3 allows for contraction and expansion

4 resists heaviest traffic

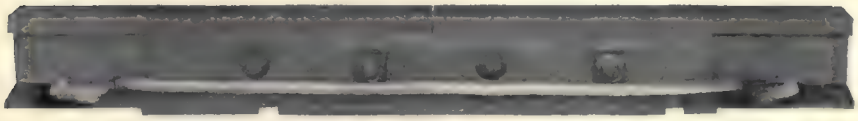
5 is easily removable

6 has practically 100% salvage value

# Every Track Operating Condition Is Covered with Erico Bonds

*Brazed Bonding with Type SR Outfit*

*Type A-2, Steel Arc Weld Bond, Applied*



Twenty-five years of active service and development in this particular phase of railway operation has established the name "Erico" among operators.

Such features as perfect return circuit, permanent installation at low cost, elimination of long delays which hamper service, and non-injury to either bond or rail due to method of installation are in a large measure responsible for the increasing demand for Erico rail bonds.

Erico bonds are manufactured in the following types—Patented Brazing type—Copper Weld type—Arc Weld type. Portable equipment for applying any of the above is another part of Erico service.

If interested in bonding equipment that will wear longer and cost less, consult our engineers.

Circulars covering any of the above equipment will be sent upon request.

*Type CAE, Copper Weld Bond, Applied*

## The Electric Railway Improvement Company

2070 East 61st Place Cleveland, Ohio

1 ton or 1000

RAILS

L·B·FOSTER COMPANY

PITTSBURGH · CHICAGO · NEW YORK

# Time Tells The Toncan Story

YEARS and years of maintenance-free service is the story of Toncan Iron culverts.

Easy to handle; no chance of breakage; strength to resist the vibration of passing cars. These are advantages enjoyed by any corrugated culvert.

But Toncan Iron culverts have still another advantage that is true of Toncan alone. The material—iron alloyed with copper and molybdenum—lasts far longer.

Toncan Iron builds up its well-known resistance to corrosion and exposure by the inclusion of copper and molybdenum. These elements give the naturally resistant iron a still further protection against weathering and corrosion.

For permanence at reasonable cost, install Toncan Iron culverts.

Following are the makers of Toncan Culverts. Write the nearest one:

The Berger Manufacturing Co. Roanoke, Virginia
Tri-State Culvert Mfg. Co. Memphis, Tenn.
The Canton Culvert & Silo Co. Canton, Ohio
The Firman L. Carswell Mfg. Co. Kansas City, Kan.
The Berger Manufacturing Co. Minneapolis, Minn.
The Berger Mfg. Co., of Mass. Boston, Mass.
The Berger Manufacturing Co. Philadelphia, Pa.
The Berger Manufacturing Co. Dallas, Texas
The Berger Manufacturing Co. Jacksonville, Florida.
The Pedlar People Limited, Oshawa, Ontario, Canada

CENTRAL ALLOY STEEL CORPORATION, *Massillon*, OHIO

*Makers of Agathon Alloy Steels*

Cleveland Detroit Chicago New York St. Louis
Syracuse Philadelphia Los Angeles Tulsa
Cincinnati San Francisco Seattle

# TONCAN IRON

# WHARTON

## SPECIAL TRACKWORK

## *TISCO*

A typical illustration of trackwork construction furnished by us to the Department of City Transit, Philadelphia, for the new Broad Street Subway. Illustration shows application of Manganese Steel Guarded Switches (double tongue switches) and of Manganese Steel Rail-bound frogs of the AREA design.

Special as well as standard types of construction, receive the same careful treatment. Each piece in each layout is carefully checked, each heat carefully analyzed and tested, to insure the quality necessary to sustain the reputation which Wharton - Tisco Manganese Steel Trackwork enjoys.

**Tandem Switch**
**For Broad Street Subway**
**Philadelphia**

## WM. WHARTON JR. & CO., INC.

EASTON, PA.

Two birds and a single stone to kill them

# NUTTALL
## Standard Helical
# GEARS

Nuttall Standard Helical Gears operate without vibration. Their meshing is smooth, noiseless,—and hence they eliminate one of the basic causes of high motor maintenance, and general car depreciation. Nuttall equipped cars are *quieter* on the road, easier to ride in,—*well* in tune with the most modern ideas of transportation comfort and economy.

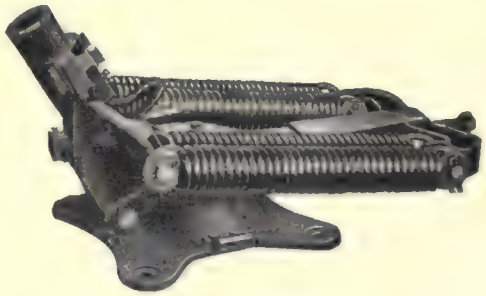
Furthermore Nuttall Standard Helicals undergo the famous B.P. Heat Treatment which adds a guaranteed 300% to their service life as compared with gears of untreated steel. That alone would warrant your using them.

But why not make the test yourself? Next time a car comes in for new gears put on a set of Nuttall Helicals. We'll gladly co-operate. Meanwhile write us for your copy of a very interesting booklet we publish on this subject. It contains a raft of useful service data.

**R.D.NUTTALL COMPANY**
**PITTSBURGH PENNSYLVANIA**

**All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.**

MEMBER AERA 1927



**NUTTALL**
**Timken Equipped**
**TROLLEY BASE**
**Form U.S. 20A**

A simpler, longer-lived, easier to maintain trolley base, as far in advance of old designs as the modern car is ahead of cars built twenty years ago. Timken has made a special double-race tapered roller bearing for this service, and the base actually hangs on the bearings, not on the center pin; "cocking" strains are evenly distributed; all wearing parts hardened; and lubrication taken care of through a one-in-six-months oiling system.

# Nuttall

*At the convention*

# The "Thomas Built" Car

*attracted much favorable attention—*

The modern car idea is progressing in the Southern Cities. The latest city to adopt the most modern car is Sheffield, Ala. The Alabama Power Company recognizes the modern car as a means of increasing patronage and safety at a lower cost per passenger, and as the basis for building net revenues.

The new *"Thomas Built"* lightweight, one-man, single end Safety Cars recently placed in service by the Alabama Power Company in Sheffield are the last word in safety car design, quality workmanship, appearance, comfort and low maintenance.

The modern car movement is proving that the continuance in service of obsolete cars is an economic waste. The modern car will pay its own way—let us demonstrate with figures!

PERLEY A. THOMAS CAR WORKS
High Point, N. C.

*Features*

1. Stream lines, giving neat and attractive appearance to exterior.

2. Floor ramped from bolster to door opening, giving low step heights.

3. The interior presents an attractive appearance to the public, featuring rubber flooring, leather seats, white porcelain enamel stanchions with aluminum fittings.

4. Belt rail made of pressed steel, reinforced with 2½ x ¼ in. angle, giving greater strength to top girder side.

*Features*

5. Bolsters reinforced with cast iron filler. This eliminates all bolster and side sill breakage.

6. Angle iron bolster struts reinforcing the side girder which carries the full weight of car body.

7. Side knees made of two angles riveted to top and bottom of sheet steel plate. This in turn is riveted to angle corner post reinforcing and angle bolster reinforcing, eliminating all sagging in platforms and of sufficient strength to withstand the most severe collision.

# *In railroad shops the world over —*

QUALITY equipment insures quality in rolling stock and motive power, consequently, quality service.

The De Kalb Avenue Shops of the B.M.T. are practically show rooms for high grade equipment.

Every unit is backed by records of proven performance, all are outstanding in their respective fields.

In the forge shops there are eight "Buffalo" Down Draft Forges—both single and double types.

They are giving the same satisfaction in service in these shops as you find them doing the world over.

Buffalo Forges are made in both stationary and portable types for every industrial need.

Our new catalog illustrates and describes them, as well as "Buffalo" Punches, Shears, Bar Cutters, Bending Rolls, Blowers and Exhausters of all types.

features of up to date practice in

BMT

the years model street railwa shop

"Buffalo"

## Buffalo Forge Company

149 Mortimer St., Buffalo, N. Y.

In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

## Down Draft Forges

eatures of
up to date
ractice in

BMT

the years
model
treet railway
shop

A part of a Forty Bradley Washfountain installation in use at the DeKalb Avenue Shop, B.-M. T. Ry., Coney Island, N. Y.

# When the whistle blows in the De Kalb avenue shop

Bradley Washfountains furnish the most approved and modern method of attaining sanitation, convenience and economy.

After using four Bradley Washfountains since August, 1925, at the Coney Island shops of the B.-M. T., 36 more were ordered. At the Brooklyn shops, an initial installation of 10 fountains was followed by the addition of two more.

*Other users of Bradley Washfountains:*

Pennsylvania R.R.
Norfolk & Western R.R.
Florida East Coast Railway
Reading Railroad
Wabash Railway
Richmond, Fredericksburg & Potomac R.R.
Alabama Great Southern R.R.
Atlantic Coast Line R.R.
Baldwin Locomotive Works
Baltimore & Ohio R.R.
Boston Elevated
Carolina, Clinchfield & Ohio R.R.
C. B. & Q. Ry.
Chicago Union Station
Chicago & Northwestern Ry.
Grand Trunk Railway
Georgia Railway & Power Co.
Long Island Railroad
Miami Beach Ry.
Mobile & Ohio Railroad
Monongahela R.R.
Nashville, Chattanooga & St. Louis R.R.
New York Central
Philadelphia Rapid Transit
St. Louis & San Francisco Railroad
Southern Pacific Railroad
Western Pacific Railroad
Westinghouse Air Brake Co.
Westinghouse Electric & Mfg. Co.
General Electric Co.

## BRADLEY WASHFOUNTAIN CO.

2211 Michigan St.,

MILWAUKEE, WISCONSIN

OVER 300,000 PERSONS WASH EVERY DAY IN 5,500 BRADLEY WASHFOUNTAINS IN 1000 INSTALLATIONS

# DESPATCH ELECTRIC OVENS

## *and complete Automatic Control Equipment, accurately fitted to the needs of the B.M.T. by the largest exclusive Manufacturer of ovens in the United States . . .*

B. M. T. also installed a Peerless Armature Banding and Slotting Machine and Peerless Pinion Pullers.

Our engineering experience in the design and construction of oven equipment goes back more than 24 years.

During this time we have naturally gained a very broad knowledge of every particular oven requirement for all industries—especially in the baking of coils and armatures and also the baking of japans and enamels.

Furthermore our plant facilities organized on the most modern production basis, enable us to quote very attractive prices for units which we can guarantee in every particular.

Engineering Service on the subject of your oven requirements will incur no obligations. A special Engineering Inquiry Sheet is furnished, with our very complete catalogue, which entitles you to obtain any information, which you might desire, pertaining to ovens. This catalogue, which gives valuable information concerning baking problems and also many illustrations of actual installations, will be gladly mailed to you upon request.

*Wherever Despatch Electric Ovens are installed, coils and armatures are actually baked and bring about amazing reductions in the cost of the maintenance of electrical equipment.*

DESPATCH OVEN COMPANY
EASTERN DISTRIBUTORS

# ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Illinois Merchants' Bank Bldg.

PITTSBURGH
1123 Bessemer Building

BOSTON
88 Broad St.

SCRANTON
316 N. Washington Ave

DETROIT
General Motors Bldg.

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

# Modern Tool-Room Practice

*Above—*
Grand Rapids Drill Grinder. Self-contained motor drive.

*At the right—*
Grand Rapids No. 1 Universal Cutter and tool grinder with internal grinding attachment. Self - contained motor drive.

*In a Modern Shop!*

Indicative of modern tool-room grinding practice the above illustrations show the methods used by the B.M.T. in its modern De Kalb Avenue shops! Of course the machines shown are

## "GRAND RAPIDS GRINDERS"

Most modern tool - rooms are so equipped. They are noted for the quality and quantity of work turned out, convenience of operation, investment and upkeep costs, universal features and small floor space occupied.

We will be pleased to send catalogue giving complete description and specifications of Grand Rapids Grinders, or gladly quote on your requirements.

## GALLMEYER & LIVINGSTON COMPANY

**300 St. Avenue S.W., Grand Rapids, Michigan**

*The new DUFF (Genuine Barrett) General Purpose Jack No. 540, as shown above, is of 15-ton capacity, single acting, automatic lowering type. It is equipped with swivel top and hinged base and can be applied in four ways: (1) straight lifting load on head; (2) with chain; (3) with claw; (4) with foot-lift. Double socket lever makes it convenient to operate in cramped quarters.*

THINK of DUFF Jacks in terms of lifting service. When you buy a DUFF Jack you are actually buying the ability to lift with safety, definitely known capacities . . . buying a *service* not for today alone, but for next year and for years to come.

Over forty years of engineering experience in meeting the most difficult conditions—modern plant facilities assuring accuracy in workmanship and perfect control of materials—make DUFF Jacks more efficient and easier to operate.

The first cost of perfect lifting service is reasonable with DUFF Jacks—and the absence of expensive upkeep charges year after year, combines with this low initial cost to make them more economical than any other jacks on the market.

*DUFF Jacks are GOLD MEDAL JACKS—awarded the Gold Medal—the highest award—at the Sesqui-Centennial Exposition, Philadelphia, 1926; also at St. Louis 1904, Portland, Ore. 1905, and Buenos Aires, 1910—in competition with the world.*

*Write for detailed literature on jacks in which you are especially interested.*

THE DUFF MANUFACTURING COMPANY, Pittsburgh, Pa.

Established 1883 Cable Address "Leverjack"

NEW YORK ST. LOUIS CHICAGO SAN FRANCISCO ATLANTA HOUSTON

DUFF JACKS

TIME CHANGES in the circuit of the globe. Conditions change, and customs, too. But any time and every time, anywhere and everywhere, all over the world, wherever you find modern advance in the ways of doing things, you'll find Consolidated Heating and Safety Equipment performing dependably, economically and satisfactorily —*all the time.*

*Keep Up To Time With* CONSOLIDATED

ELECTRIC HEATERS | PNEUMATIC DOOR OPERATORS | THERMOSTATIC CONTROL | BUZZERS AND BELLS

CONSOLIDATED CAR-HEATING CO.

NEW YORK ALBANY, N. Y. CHICAGO

# *Do your Records include all riders?*

Electric railway operating statistics include only the passengers whose fares reach the Company treasurer. Does this include *all* the riders on your system? Does your present fare collection method insure that all fares are reaching your treasurer?

## PEREY Automatic Turnstiles and Passimeters

take uncertainty out of fare collection and guess out of the number of passengers handled. Perey equipment, by eliminating the erring human factor, assures automatic protection of passenger revenue.

And think of the economy derived from the use of Perey equipment. No attendants are necessary! They are operated by the mere act of the passenger dropping the fare into the slot. Perey equipment is adaptable to nickels, dimes or tokens, or any combination. There is a Perey Turnstile and Passimeter for every purpose.

*Write for detailed information.*

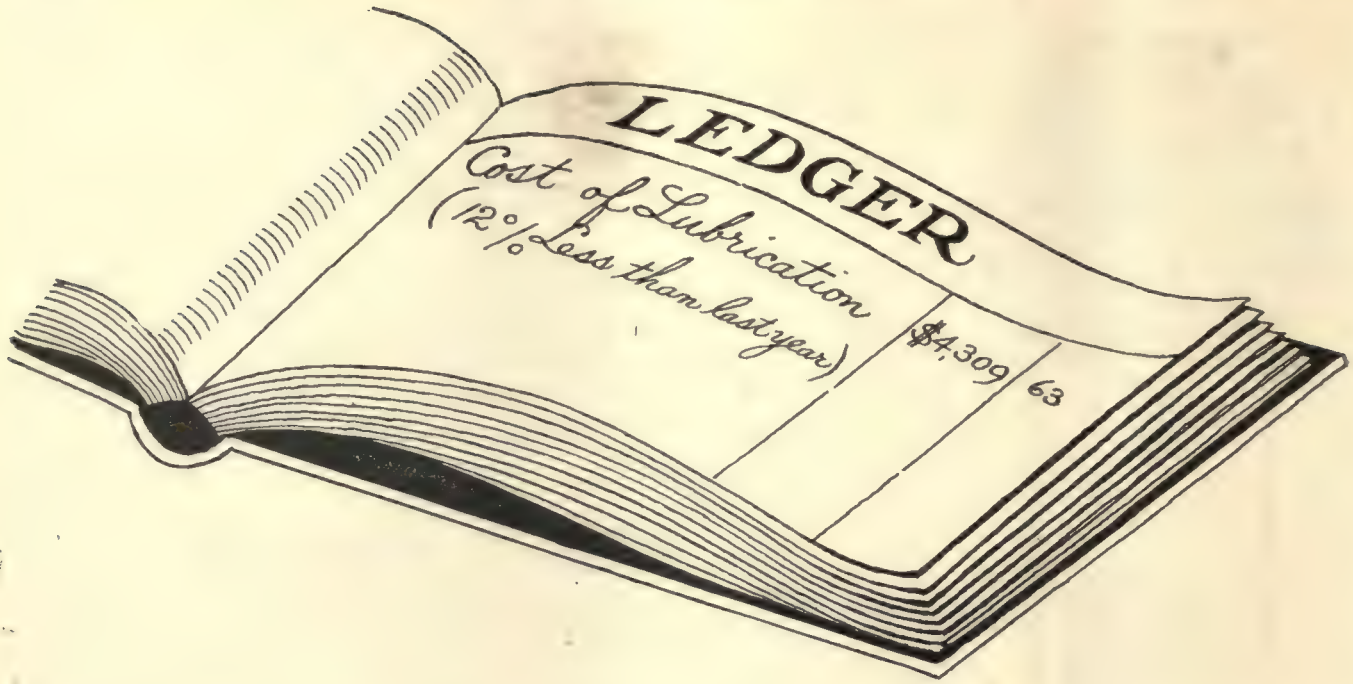
**Perey Manufacturing Co., Inc.**

**101 Park Avenue, New York City**

**Automatic visible, audible and instantaneous registering fare box. Adapted to nickels, dimes, tokens or any combination. Mere dropping of fare in slot operates it.**

**Passimeter registering number of people handled, giving automatic and accurate Count.**

**Battery of electric coin turnstiles, collecting and registering each individual fare and passing individual to train platform. Users—B-M-T, Phil. R. Tr., Pub. Serv. Ry., Boston Elevated.**




# —But this does not always prove that the Road is saving any money

The ledger is not the place to look for savings.

The right place is to go back to the shops and see what effects lubrication has had on:

**Renewal of bearings**
**Replacement of gears and pinions**
**Repairing of compressors**
**Replacement and repair of miscellaneous mechanism.**

*These* are the things that count, and that is the way to judge—by RESULTS of lubrication.

THE TEXAS COMPANY
DEPT. R-J. 17 BATTERY PLACE · NEW YORK CITY
HOUSTON · CHICAGO · NEW YORK
OFFICES IN PRINCIPAL CITIES

That's logic—and good business.

Good business for the road and good business for TEXACO Lubricants.

For *we* want to be judged by what we do *on the cars.*

What TEXACO Lubricants are doing on the cars for hundreds of millions of car miles is putting them and keeping them on more and more miles all over the country.

* * * * * * * *

If your road is using TEXACO Lubricants you can readily understand the growth of our business.

If you haven't taken up with TEXACO yet, you will appreciate this short statement of what TEXACO stands for:

**1-** Suitable lubricants sold at a price that is fair to the customer and to us.

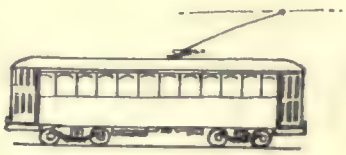
**2-** Texaco Lubricants are manufactured exclusively at The Texas Company's Refineries and, hence, they can be backed up by a positive assurance of uniformity and efficiency.

**3-** Prompt delivery of every kind of lubricant used by the Electric Street Railways whether for rolling stock, shop or power plants.

**4-** Prompt delivery of burning oils, or gasoline, if you need them.

**5-** Unstinted engineering service through experienced and capable lubricating engineers.

**6-** A degree of friendly cooperation you never realized until you took up with TEXACO.



***We* want to be judged by what we do *on the cars!***

## We are ready to have you take it up with us

It will put you under no obligation to have a well equipped TEXACO Engineer call and explain why TEXACO doesn't often lose a customer—and, if you wish it, this man will be glad to inspect your property and tell you just what can be accomplished in lower maintenance cost through improved lubrication.

TEXACO

# THE TEXAS COMPANY

DEPT. R-J. 17 BATTERY PLACE · NEW YORK CITY
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OFFICES IN PRINCIPAL CITIES

TEXACO

# From mine to finished product—

## *we control every step of manufacture*

Thus we insure the high quality and unvarying dependability of Micanite.

The raw India mica we use is secured from mines which we own and operate through associate companies. We operate our own amber mica splitting plant in Victoriaville, Canada. In our plants at Schenectady, N. Y. and London, England, Micanite is turned out in its final form.

For 33 years Micanite has been made to one standard—*the highest.* The name MICANITE means *assured* quality.

MICA INSULATOR COMPANY

*World's Largest Manufacturers of Mica Insulation*

Sole Manufacturers of Micanite, Super-Micanite and Empire Electrical Insulations

New York: 68 Church Street Chicago: 542 So. Dearborn St.

Cleveland Pittsburgh Cincinnati Seattle

San Francisco Los Angeles Victoriaville, Canada

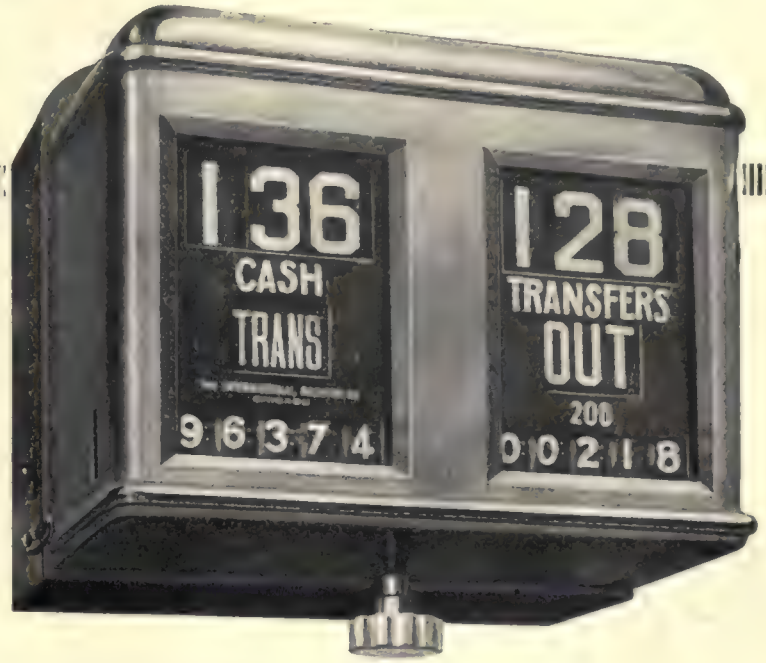
PERFECT MICANITE INSULATOR REG. U.S. PAT. OFF.

Electrical INSULATION

PERFECT EMPIRE INSULATOR REG. U.S. PAT. OFF.

MICA INSULATION OILED CLOTH INSULATION

# Practical Revenue Protection Is Maintained By Electric Fare Registration



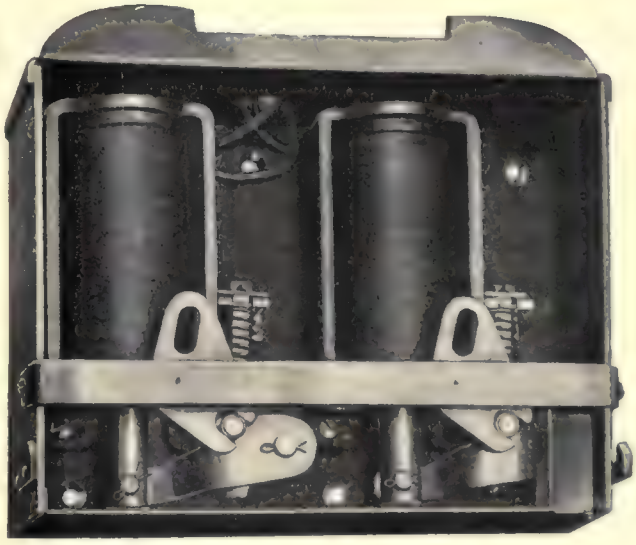

International electrically-operated fare registers are as far superior to all other fare recording devices as modern electric street railways cars are superior to the horse cars of yesterday. The speed, reliability, and simplicity of electric operation is unquestioned. Accuracy of registration for both fares and transfers is assured with the model shown at the right.

INTERNATIONAL Electric Fare Registers require less time and attention and effort to operate from the trainman—materially increasing his efficiency.

These registers operate by means of a foot switch on the platform. Pressure on switch pedal registers fare instantaneously. The record thus made cannot be tampered with.

The electric back of the double register, at right, shows windings to operate on 350—650 volts, D.C. The operating circuit is not broken in the register back.

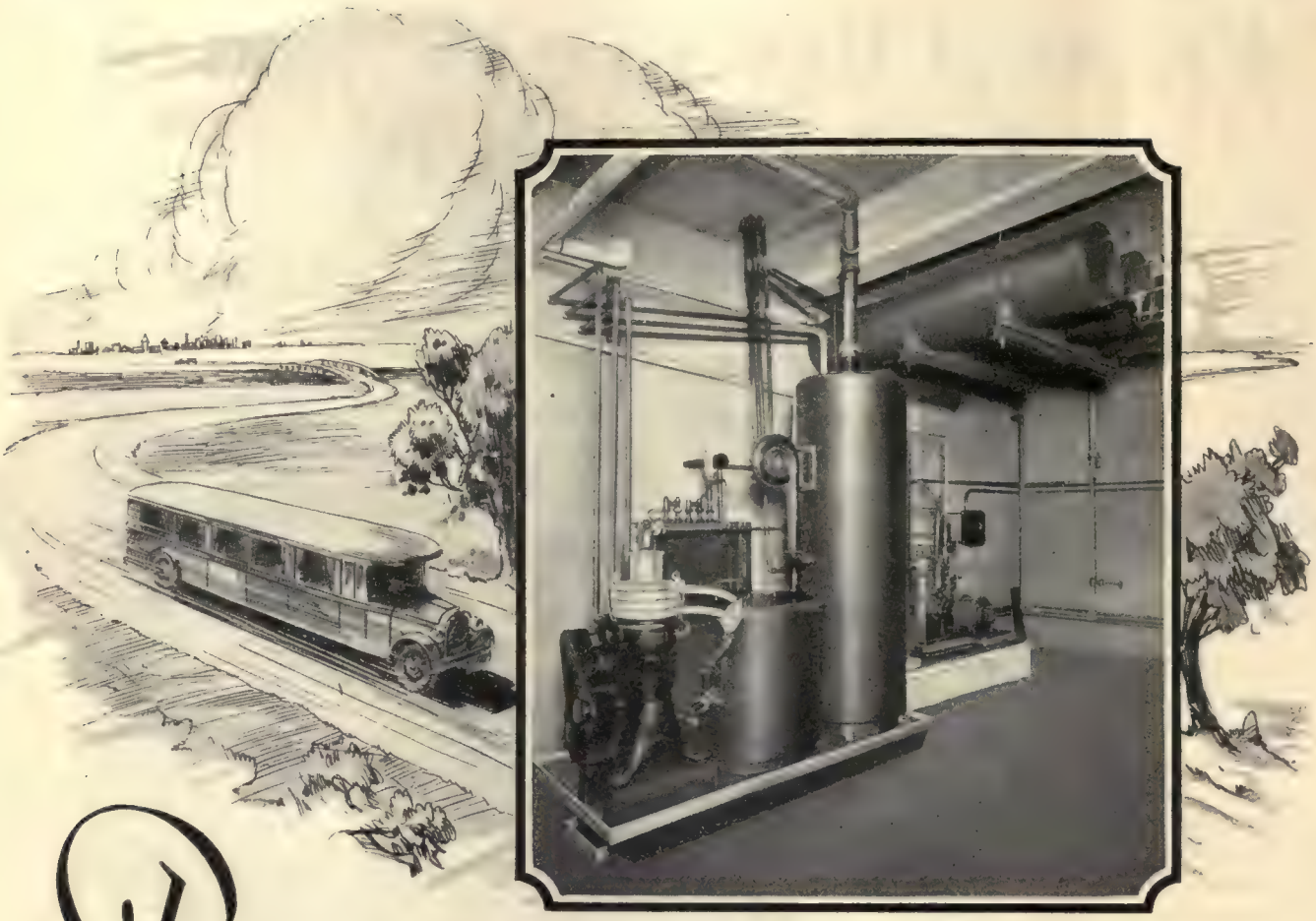
There is a full line of double and single International Fare Registers for mechanical, hand or foot operation in addition to the electrical devices.



*Write today for International Register Catalog No. 5 containing full details and descriptions.*

## The International Register Company

15 South Throop St., Chicago



# Better Lubrication for Twin City Buses

Any operator of a fleet of buses, trucks or taxicabs can lower the cost of motor maintenance by improving lubrication.

The Twin City Rapid Transit Company has done this and at the same time actually reduced lubricating costs by installing the De Laval Crankcase Oil Reclaiming Outfit.

This De Laval Outfit renews old oil, restores its viscosity—its power to lubricate and resist heat; enables you to change oil more frequently.

Most users find that over 80% of all crankcase oil used can be saved and used again, at full efficiency. This percentage of recovery amounts to about 99% of the reclaimable oil, the remainder consisting of dilution, carbon and other impurities.

Any garageman can operate the De Laval. Write today for complete details, being sure to ask for Bulletin 108-R.

THE DE LAVAL SEPARATOR COMPANY
165 Broadway, New York 600 Jackson Blvd., Chicago

DE LAVAL PACIFIC COMPANY
61 Beale Street, San Francisco

DE LAVAL

Crankcase Oil Reclaiming Outfit
Car Axle Oil Reclaiming Equipment—Transformer Oil Purifiers

# In the all-important matter of tickets

## Globe accuracy Globe Service

TRANSFERS, cash fare receipts, fare tickets, hat checks, passes and all types of tickets in books—our service to transportation organizations in the printing of these essentials to the safety of collections is nation-wide.

For more than fifty years we have rendered this service—its success and prestige founded on accuracy of numbering, quality of printing and promptness in delivery.

Consult us about the design and production of your tickets and forms—standard and special types. We shall be glad to send you full particulars on our service and samples of our work.

Specialists for half a century

# Globe

TICKET COMPANY

112 North Twelfth Street
PHILADELPHIA

BALTIMORE CLEVELAND LOS ANGELES NEW YORK

# LOOK OUT BELOW!

Trouble hits the cars with inferior brushes.

But in STACKPOLE—THERE'S a name that stands for the best carbon brushes that modern science and skill can produce.

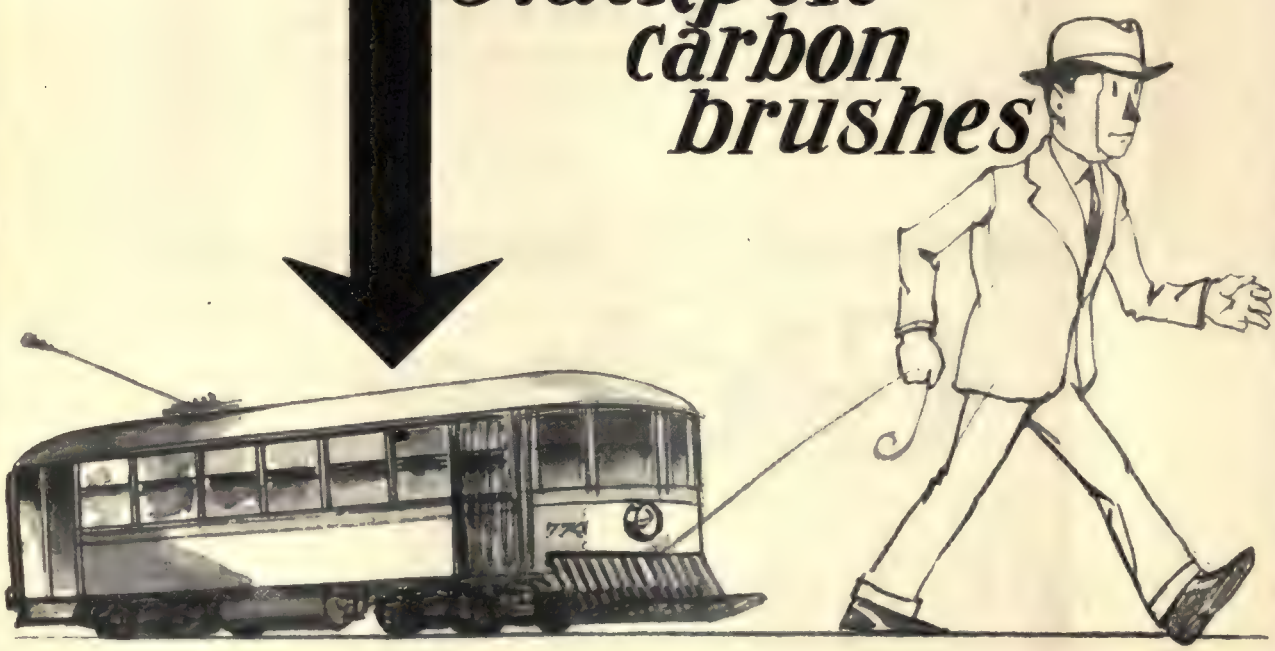
The reputation and integrity behind STACKPOLE *means* something to every careful brush buyer not only in high quality alone, but in the zeal of the STACKPOLE organization to *maintain* this wide reputation.

In the electric railway industry, STACKPOLE Engineers have studied and analyzed the brush requirements of every type of motor with the result that every Stackpole Brush used is *made for the job.*

That's why STACKPOLE'S give better commutation, last longer and remain uniform right down to the holder.

**STACKPOLE CARBON COMPANY**
**ST. MARYS PENNA.**

*Stackpole carbon brushes*



**The Speaker**

is the operating executive of one of the largest electric railway companies in the country. All street cars and buses in the system are operated one-man, with no loss in schedule speeds and improved satisfaction on the part of the passengers.

# *"The success of our 100% one man operation on buses and street cars would be impossible without*

# JOHNSON ELECTRIC FARE BOXES"

## *"Every Ring of the Bell* Spells Savings"

**S**chedule speed of street cars and buses in service is increased.

**A**ccounting of fares at the instant of collection on the platform.

**V**aluable traffic data of passengers carried, and earnings with relation to cost of operation.

**I**nstant registration of individual fares by the coin itself.

**N**ightly or daily earning record of individual street car and bus.

**G**ross earnings from operation increased.

**S**afety-first principle made possible.

SPELLS "SAVINGS" that can be had with the use of the Johnson Full-automatic electric fare box on your street car and bus operation. It is the only device which full-automatically instantly registers each and every individual fare audibly and visibly. This device represents the very last word in fare collection.

Electro-magnet type of fare box—NOT motor driven; no drain on battery.

*Write for particulars.*

# JOHNSON FARE BOX CO.

CHICAGO, ILL.
4619 Ravenswood Ave.

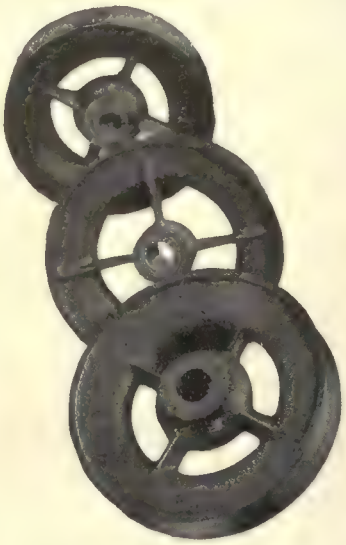
NEW YORK, N. Y.
2 W. 61st St.

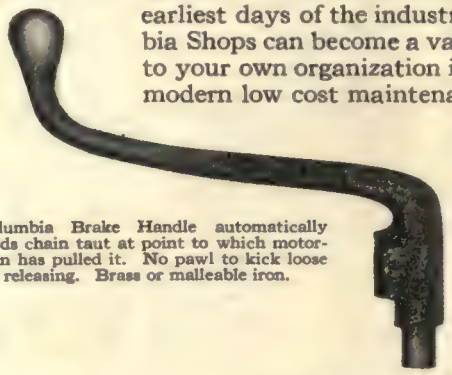
# COLUMBIA—*National*

Columbia Service is now in its 35th year. Facilities were never more complete. Well rounded stocks of standard specialties assure prompt deliveries.

And, with experience in serving electric railways dating back to the earliest days of the industry, the Columbia Shops can become a valuable adjunct to your own organization in planning for modern low cost maintenance.

Call upon us freely

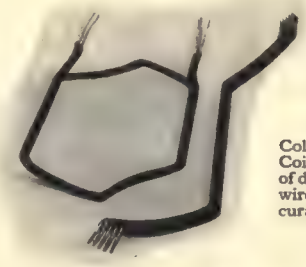




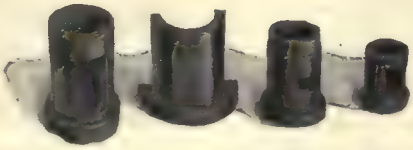
Columbia Brake Handle automatically holds chain taut at point to which motorman has pulled it. No pawl to kick loose for releasing. Brass or malleable iron.

We are equipped to produce a wide variety of both light and heavy forgings. The Equalizer Bar and Brake Rigging illustrated are an example of the latter type. Produced to blue print and specifications.

Columbia Gear Cases. Absolutely oil water and dust tight. Top and bottom flanged over sides and ends with brackets bent over sides to remove all strain from rivets.



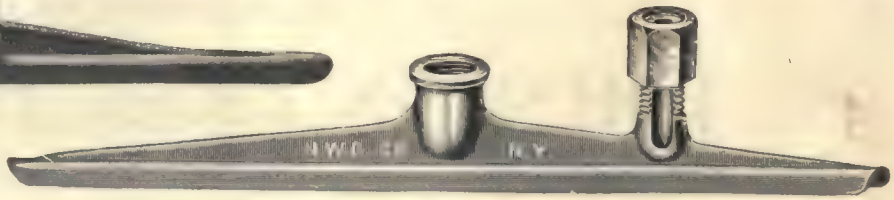
Columbia Armature and Field Coils made from the best grade of double cotton covered magnet wire, moulded or pressed to accurate slot dimensions.



Columbia Armature, Axle and Journal Bearings. Made of specially developed bearing bronze, known as Columbia No. 1 which has been adopted by a large number of roads as standard because of its long wearing qualities.

Columbia Standard Fingers and Segment Burning Tips. Control Fingers of the removable tip type and interchangeable with the non-removable tip type. Construction insures good contact with shunt finger spring. Burning Segment Tips made for all types and service to permit quick replacement wherever contact is broken or worn.

Columbia Line Ears. Made of specially developed composition metal withstands shocks of wheel and pole; all kinds of weather decomposition caused by electric arc and the clinching of the lineman's tools.

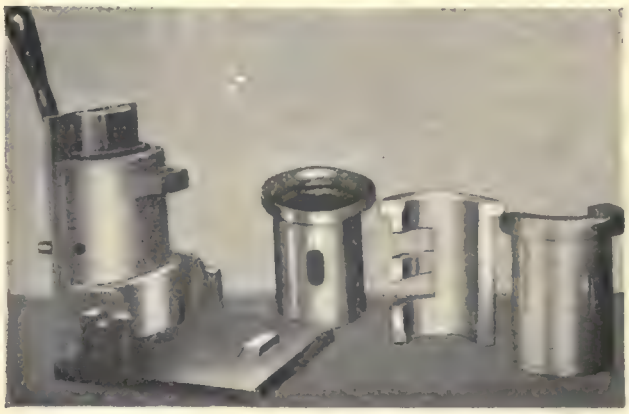


# Headquarters for Maintenance

## Columbia Machine Works and M. I. Company

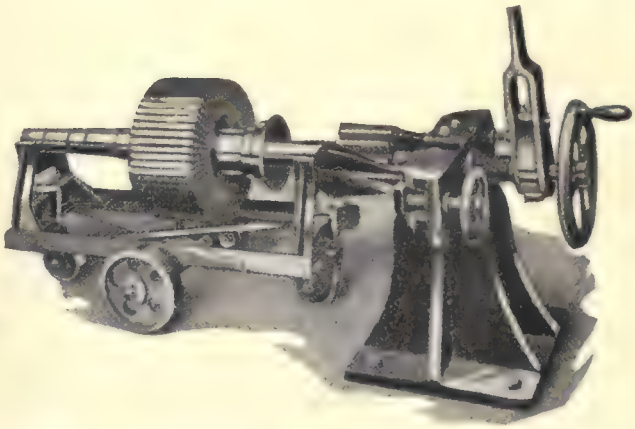
265 Chestnut Street, Corner of Atlantic Ave.,
Brooklyn, New York

Armature Banding and Heading Machine. Self contained and instantly adjusted tension and feeding attachment. No stranding of wire by operator. Worm drive enclosed in air-tight dust proof case. All bearings bronze.



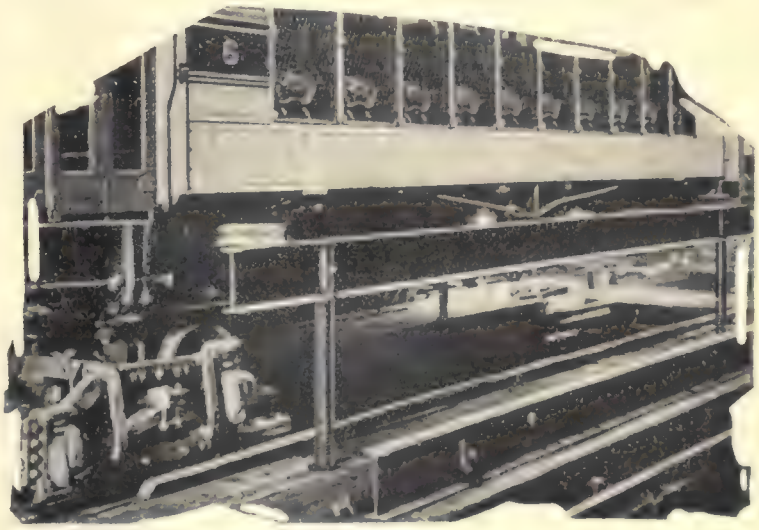
Columbia Babbitting Moulds. The only device which will babbitt axle bearing halves in center and made same strictly interchangeable.

Columbia Coil Winding Machine. Stopped or started instantly. Occupies only four feet floor space. Worm drives enclosed in oil and dust proof cases. Extension spindle for small coils, spools or magnets.

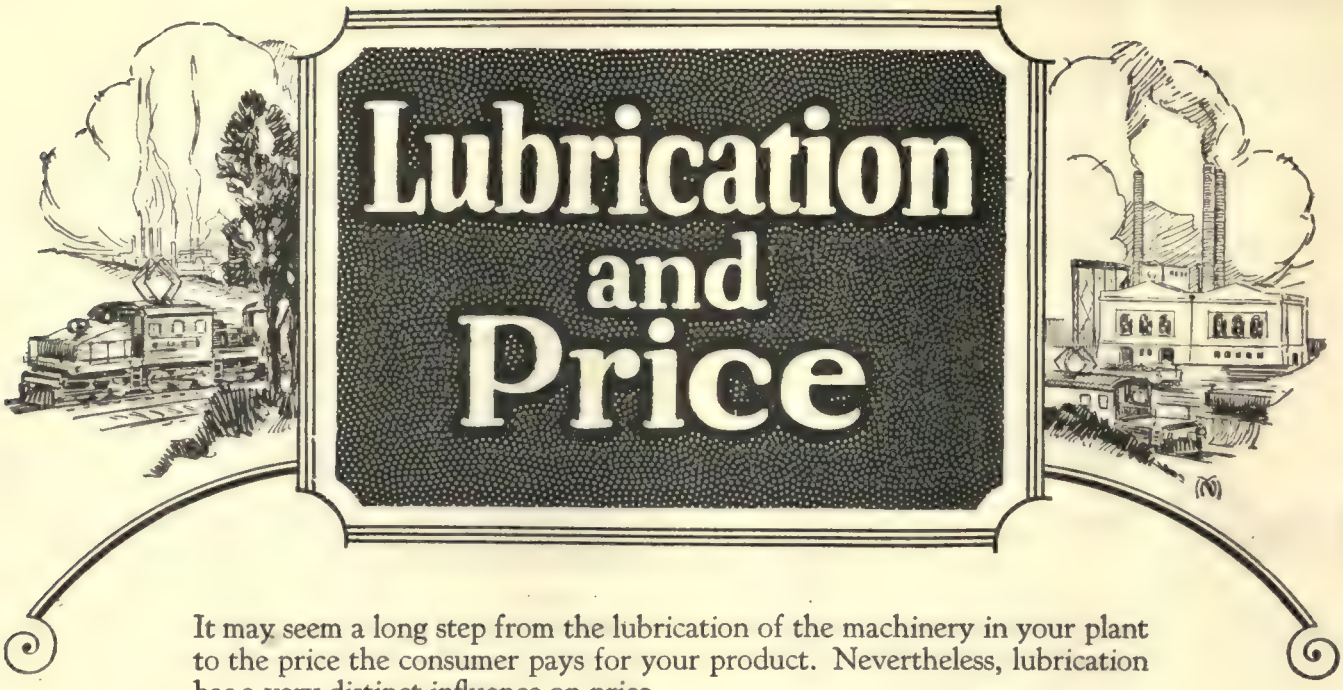


Pinion Puller. Quickly removes pinions, wiping rings or armatures. Adjustable swinging head. Small hand wheel for ordinary adjustment. Large wheel for quick applications. Grippers and Yokes of best crucible steel.

Columbia Trolley Wheels, Poles and Harps combine the essentials of ample conductivity, with proper hardness for minimum wear on wire and maximum wheel mileage. Poles and Harps are light, yet strong and dependable.



Columbia Electric Car Hoist will raise a 50-ton car six feet in less than five minutes. Quick and efficient, saving worker's time and affording safety to pitmen and equipment.




It may seem a long step from the lubrication of the machinery in your plant to the price the consumer pays for your product. Nevertheless, lubrication has a very distinct influence on price.

Machinery which is not properly lubricated is sure to wear out prematurely. Repairs and replacements are required and the cost of these repairs and replacements must be added to the price of your product and passed along to the consumer.

Moreover, an incorrectly lubricated machine uses more power in operation than does a machine which is correctly lubricated. This means a larger fuel bill—another item which must be paid by the consumer.

In these days of sharp competition, the bulk of the business goes to the factory or plant which cuts its cost of production to the last possible cent, and gives the consumer the most for his money.

## Standard Oils and Greases

can help you to cut your production costs. They reduce friction to the minimum, lower repair and depreciation costs and do away with the premature wearing out of machinery.

Standard Oils and Greases are made in grades to suit the lubrication requirements of all machinery now in use in the industrial world. Our agent will be glad to examine the machinery in your plant and recommend the correct grades.

STANDARD OIL COMPANY
(INDIANA)
910 South Michigan Avenue Chicago, Illinois

# Two courses are open in buying

# *Trolley Cord*

## You can buy—
## *"just trolley cord"*

In which case you will pay a low first price for a product of doubtful quality.

It may give you fairly good service, or it may break at a critical moment. It may jam the catchers on wet days, and then dry out stiff as a board. It may in fact cause trouble and expense in countless small ways. In any case it will give *short wear.*

## Or you can buy—
## SAMSON SPOT CORD

The colored spots tell you at a glance just what you're buying—a cord made from extra quality yarn smoothly braided, uniform in thickness, and properly waterproofed by a special process.

Samson Spot Cord is always the same. It will always give *long wear.*

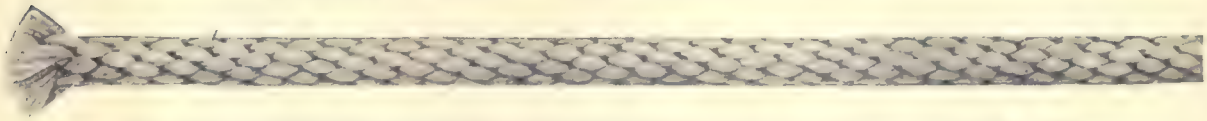
It does not swell or shrink,—runs easily in catchers and retrievers, rain or shine.

And when you consider that this good cord costs so very little more, is it worth taking a chance?

## SAMSON SPOT TROLLEY CORD

TRADE MARK REG. U. S. PAT. OFF.

### SAMSON BELL AND REGISTER CORD



You can buy Samson Bell and Register Cord with absolute assurance that it is of the same high quality and manufactured with the same care as Samson Spot Trolley Cord. Its neat appearance and finish match the finest of car interiors. It resists abrasion. Can be supplied in any reasonable length, in white, mahogany or drab—other colors to order.

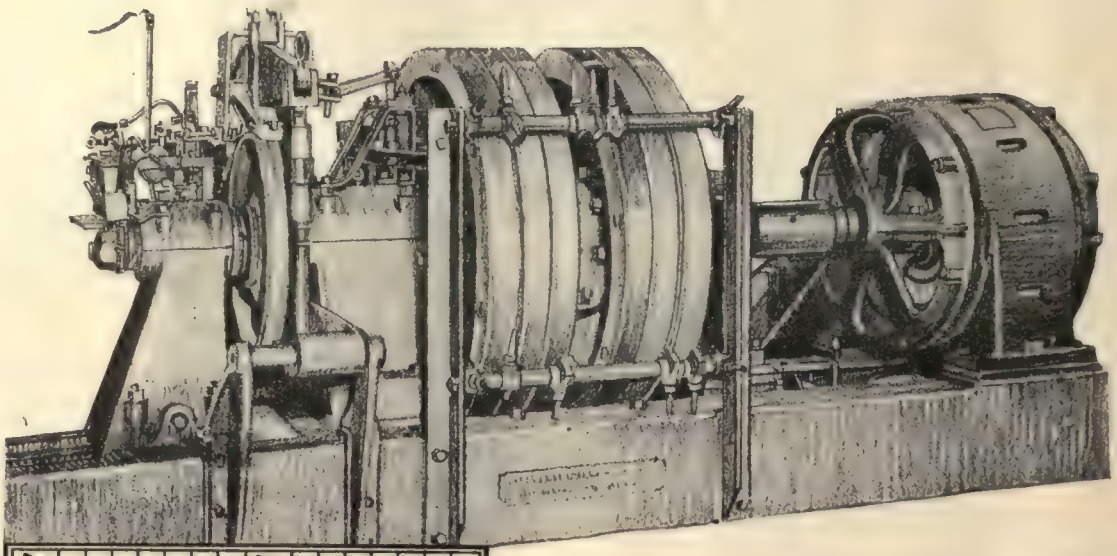
Samson Signal Cord with galvanized wire center is made in mahogany color, sizes No. 6 and No. 8.

*Samples on Request*

# SAMSON CORDAGE WORKS

88 BROAD STREET BOSTON, MASS.

TRADE MARK



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# Years Ahead!

On the American Brake Shoe testing machine—the only machine of its kind operated by a manufacturer of brake shoes—brake shoe materials can be as fully tested in a day as in many months of actual service. The element of time has thereby been greatly reduced in brake shoe development and it may truthfully be said that American Brake Shoes are "years ahead."

*"Best by Test"*

**THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY**

30 CHURCH ST., NEW YORK
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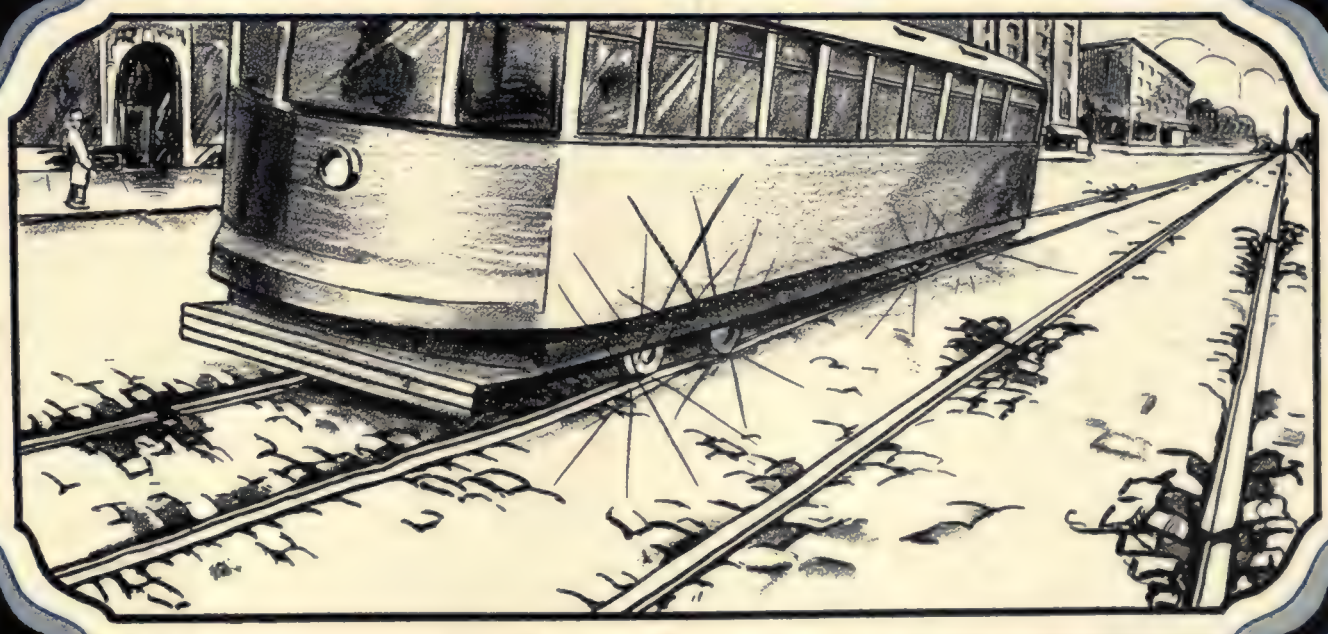
# What's the use of modern rolling stock if you pound it to pieces on bad track?



**The Dayton Mechanical Tie Co.**

Dayton, Ohio

# Dayton Shock Absorber Track Preserves Your Modern Rolling Stock

MOST conclusive is the case for modern rolling stock—the railway industry knows that it pays.

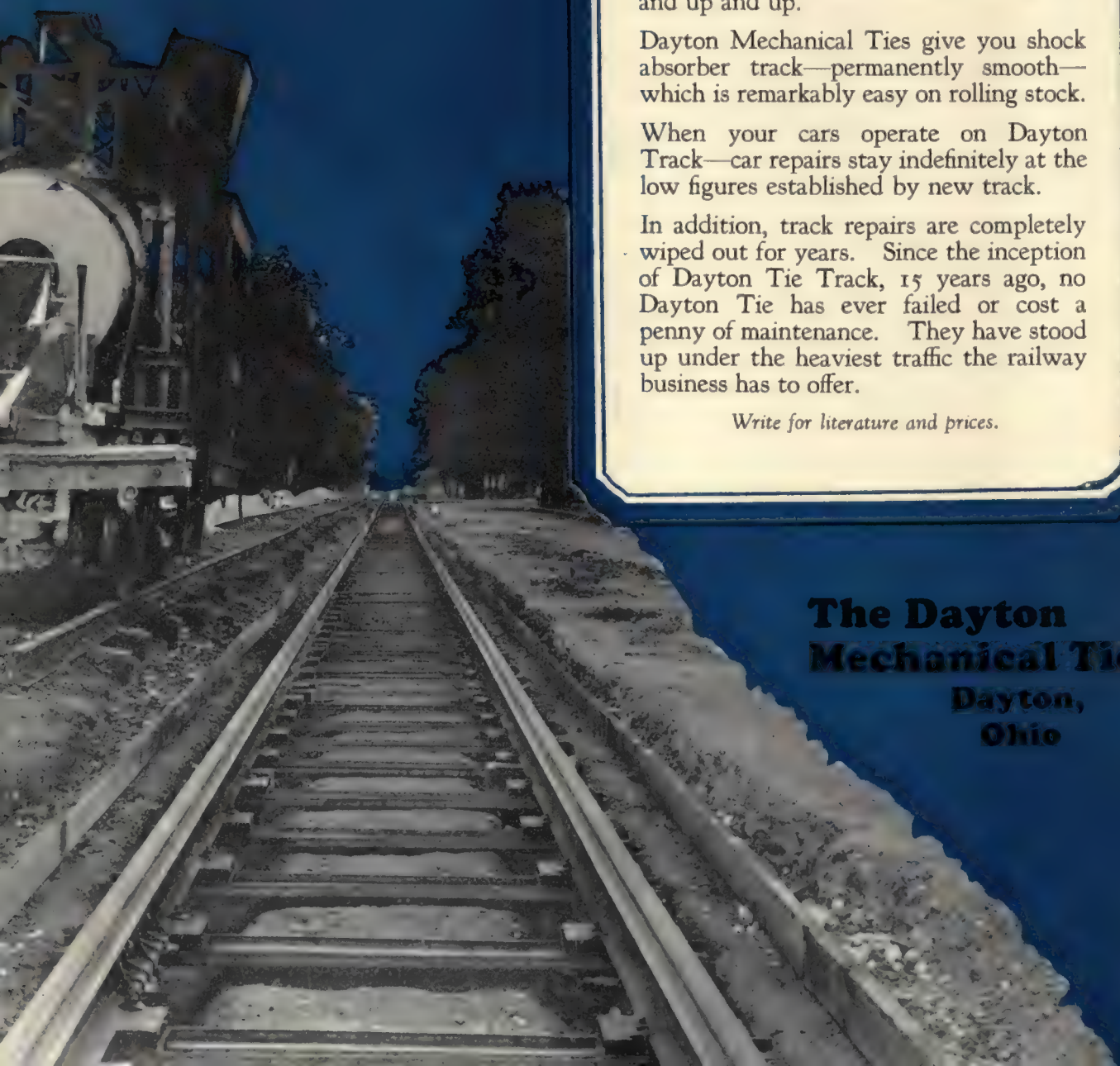
But if your track is bad, the modern rolling stock isn't going to have the life it should. It will be pounded to pieces—rolling stock maintenance will go up and up and up.

Dayton Mechanical Ties give you shock absorber track—permanently smooth—which is remarkably easy on rolling stock.

When your cars operate on Dayton Track—car repairs stay indefinitely at the low figures established by new track.

In addition, track repairs are completely wiped out for years. Since the inception of Dayton Tie Track, 15 years ago, no Dayton Tie has ever failed or cost a penny of maintenance. They have stood up under the heaviest traffic the railway business has to offer.

*Write for literature and prices.*



**The Dayton Mechanical Tie Co.,**
**Dayton, Ohio**

# FORD CHAIN HOISTS

*Tribloc Chain Hoist Capacities: ¼ to 2 tons*

*Tribloc Chain Hoist Capacities: 5 to 10 tons*

*Ford Screw Hoist Capacities: ½ to 10 tons*

*Ford Differential Hoist Capacities: ¼ to 3 tons*

## Load handling facilities can mean much—or little

PROPER load handling facilities in the car shop or bus garage— properly placed for greatest convenience— can make the labor of a few men highly profitable just as the wrong type or size of hoist or an improper arrangement of hoisting equipment can hinder work in your shop. Load handling facilities in a car shop can mean much— or little.

With greater demands from the riding public for better service, look to shop facilities to keep rolling stock on the road— look to Tribloc load handling facilities to keep things moving in the shop.

Operate Triblocs under identical conditions with similar equipment — Triblocs will show a lower ultimate cost because Triblocs are built *to the job* and not to a price. This is important— comparative tests have proved it in the shops of great public utilities.

In the constant betterment of Tribloc Chain Hoists, an important development is the Tribloc load chain, made from *Special Analysis High Carbon Steel*, specially heat treated and electrically welded, adopted only after extensive research and tests.

Ford Chain Hoists— a complete line— offer complete chain hoist service. Standard and special hoists for stationary or mono-rail operation. Ford Roller Bearing Trolleys are efficient companions for Ford Triblocs.

Look for the patented Hand Chain Guide on Ford Triblocs— it is painted GREEN for quick identification— it protects the hoist in service. Let us tell you more about the special features of Ford Triblocs and other Ford Hoists, including "THE MOTORBLOC," an electrically operated chain hoist.

*Send for Catalog 7-B*

FORD CHAIN BLOCK COMPANY

2nd and Diamond Sts., Philadelphia, Pa.

# Market Street

No. 392-A
with divided
back

No. 392-A

No. 900-D

No. 208

*—for utmost comfort in every type of service—*

# Railway's new maintenance program includes several types of H-K seats

When the Market Street Railway of San Francisco, California, started their 1927 improvement program they ordered 1,278 Hale-Kilburn Spring Cushion Seats. The success of this seat program was the result of close cooperation between the operating company and the experts in seat design of the Hale-Kilburn organization.

Included in this order are 730 covered with genuine green leather to be installed in the inclosed sections of 73 cars. The remaining 548 seats are cane-covered for use in open car sections. This is merely typical of the various rehabilitation programs now in effect on other electric railways in which H-K Seats play a prominent part.

Whether you want to remodel your old cars or build new cars it will pay you to fully investigate the complete line of H-K Seats—long noted for their comfort, appearance and long wearing qualities.

## Typical H-K Seats

**No. 392-A with divided back**—luxurious plush covered revolving chair with special patented features for finest type of interurban cars.

**No. 392-A**—Built for the Market Street Railway these leather covered, reversible seats have deep, soft cushions which are both comfortable and durable.

Cane type is No. 400.

**No. 900-D**—double chair for bus or car with air spring cushion pads, attached to prevent promiscuous removal. Can also be made with extra arm and rotating feature for double end cars.

**No. 208**—de luxe divided seat with air spring cushion pads upholstered in leather or fabric.

**Complete information about our many types of seats for cars and buses sent on request.**

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Hale and Kilburn SEATS

# Hold to new-car economy

## What is Boyerizing?

Boyerizing puts more than the strength of steel into car parts and brake rigging. It builds up a glossy, glass-hard armor coating that defies wear and laughs at friction. In actual practice this means that you replace Boyerized parts *once* where you would replace ordinary steel parts *at least three times.*

### The McArthur Turnbuckle
### It's BOYERIZED

Requires only a small hand wrench to make an adjustment that "stays put." One full tooth exposed at the end of each section acts as a cutter in removing ice or caked mud.

# *in maintenance!*

Parts that outwear the average *three to four times* can help keep per-car-mile figures down where they belong.

Startling low maintenance records have been made with new car operation. But the Industry's leaders warn that these must inevitably rise as time goes on. How much they will rise depends largely on how modern and efficient we make maintenance now.

## BOYERIZE!

By making replacements as they become necessary on modern cars, with modern BOYERIZED Parts, you take a decisive step in the direction of *permanently* low maintenance. Time and again, on roads of every class BOYERIZED Parts have proved that they will outwear ordinary steel parts three to four times. Yet their cost is not even twice as much.

## BOYERIZE!!

Economies such as BOYERIZED Parts effect concern not only actual costs of maintenance, but "shopping" time and passenger safety as well. Brake rigging especially needs every ounce of the extra strength that BOYERIZING gives.

Why not order a few BOYERIZED Parts for trial,— pins or brake levers for instance. You'll soon agree we're right in our claims.

**Brake Pins**
**Brake Hangers**
**Brake Levers**
**Bushings**
**Center Bearings**
**Side Bearings**
**Chafing Plates**
**Manganese Brake Heads**
**Manganese Truck Parts**
**McArthur Turnbuckles**

## BEMIS CAR TRUCK COMPANY

*Electric Railway Supplies*

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# Up-to-date roads figure the PROFIT of maintenance *with* DIFFERENTIALS

Undoubtedly the greatest labor-saving equipment that has ever been developed for Electric Railways. More than sixty Electric Railways now operating a total of over three hundred Differential cars. In practically every case, this equipment has been made to pay for itself within the first year. Differential cars save labor on track construction and reconstruction, track maintenance, ash disposal, disposal of waste and excavated materials, snow removal, sand and coal hauling, and even save money when used as a locomotive or snow plow. It places material on the job at less than 2 cents per ton-mile gross. Full description in Bulletin D-18.

Showing how the Differential Dump Car distributes its load in desired quantities and clear of any ordinary width trench. The body is under complete control in all positions.

## DIFFERENTIAL 3-WAY MOTOR TRUCK BODY

The truck body that dumps to both sides and to the rear. A single lever governs the direction of dumping and a screw hoist taking power from the transmission furnishes the dumping force. Has many uses the rear dump cannot fill. It forms a valuable supplement to your Differential cars.

## CLARK CONCRETE BREAKER

Breaks concrete at less than 2 cents per track-foot. Speedy and safe, protects manhole covers, conduits, underground mains, etc.

## DIFFERENTIAL CAR WHEEL TRUCK AND TRACTOR

A dual traction system for electric or steam shovels, concrete mixers, etc., enabling machine to travel on rails or ground. Several large railways have shown an increased capacity of 75%, at the same time cutting the labor force in half, when their electric shovels were mounted on this device.

## The DIFFERENTIAL Electric Locomotive Crane Car

Capacity 5 tons at radii 3 ft. to 26 ft., 2½ tons at radii up to 44 ft. Speedy—safe; one-man operation. Handles rail, special track work, poles, ties, bridge timbers, and clamshell bucket work.

Designed and constructed especially for electric railways. Conforms to all electric railway clearances and meets all requirements.

Photograph shows use of the Differential Locomotive Crane Car, with extended boom, lifting and placing rails. Each crane movement is controlled through its own individual power unit. Car control from crane-man's cab when working.

# THE DIFFERENTIAL STEEL CAR CO.

FINDLAY, OHIO

# Why 'Wrought Steel' makes superior Wheels

A 10,000 ton hydraulic forging press—(twenty million pounds!)—is one of the reasons why Wrought Steel gives you unusual service. To obtain Wrought Steel, the metal is first rolled into blooms which are cut to the desired length. These discs, after reheating, are forged into wheels under enormous pressure. The wheels then pass to a rolling mill where all surfaces are rolled. After cooling, the wheels are machined to exact dimensions. This process completed, there is no possibility of irregularity in the steel structure that could cause fracture. Wrought Steel assures to the user the longest life and the greatest possible safety. It is for this reason they are specified under Pullman and passenger cars in the steam railroad field.

*Send for new booklet—*
*"Wrought Steel Wheels and Axles"*

## CARNEGIE STEEL COMPANY

**General Offices • Carnegie Building • 434 Fifth Avenue**

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1850

# STANDARD FOR SAFETY AND SERVICE

## "STANDARD" STEEL AXLES, WHEELS,

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On passenger cars, baggage cars and work cars, on double-truck cars, single-truck cars and articulated units, "Standard" Steel parts have proved that it is quality which counts and they have shown that it is safe to count upon the quality of "Standard" Steel materials.

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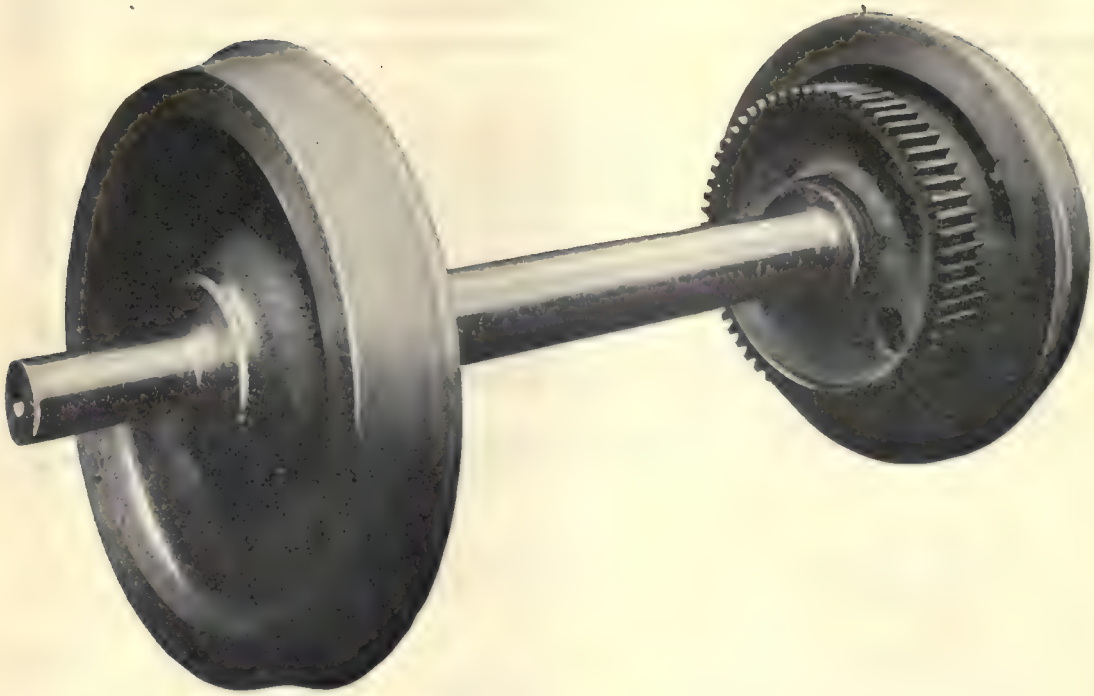


# ARMATURE SHAFTS AND SPRINGS

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This service record rests on a foundation of manufacturing and metallurgical experience dating back for many years and with all manufacturing facilities concentrated on production of these vital working parts. When so much goes into "Standard" Steel materials, it is natural to expect more *from* them.

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# 50 Plants—Daily Capacities 20,000 Wheels

## Tens of Thousands of

# Chilled Car Wheels

of A. R. A. 850-lb. type have been applied to 70-ton cars within the past 10 years. A large percentage of those first applied are still in service.

Lowest flange wear and minimum rail abrasion is record for chilled wheels.

## ? Have you investigated the savings that can be effected by using Chilled Wheels under your heavy equipment ?

*A. R. A. Standards*

650-lb. Wheel for 30-ton Cars
700-lb. Wheel for 40-ton Cars
750-lb. Wheel for 50-ton Cars
850-lb. Wheel for 70-ton Cars

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS

1847 McCORMICK BUILDING · CHICAGO

# World Wide Recognition!

# From Hawaii to New Zealand From Canada to Argentine

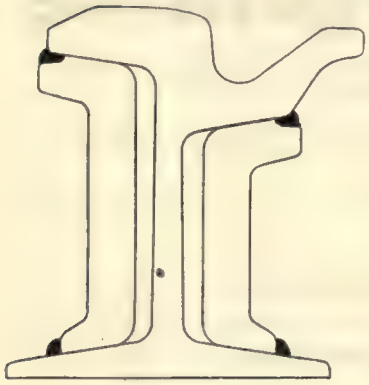
*You'll find "Tool Steel" Gears and Pinions in daily service*

**Mere laboratory tests didn't win World Wide recognition for "Tool Steel" Gears.**

**It took years and years of steady, unfailing service under all kinds of conditions to cause such universal adoption of "Tool Steel" gearing as is illustrated by the above map.**

**Each dark line indicates a nation with a least one customer. Many nations have scores of "Tool Steel" customers, as —England 92, Holland 8, Spain 28, Australia 10, Italy 30, Africa 16, Brazil 12, Chile 9, etc.**

The Tool Steel Gear & Pinion Company
Cincinnati, Ohio



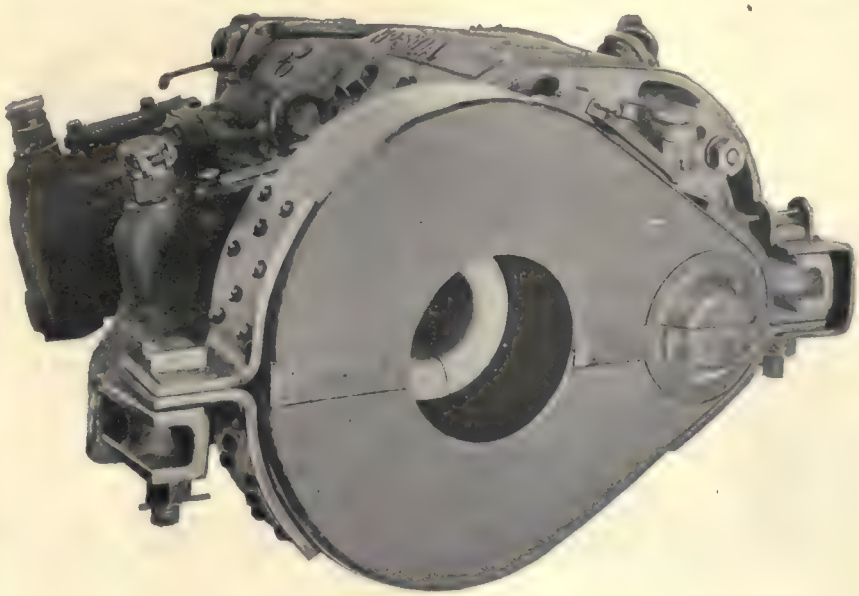
# Weld Plates

Modern welding practice and Rail Joint Company patented "WELD PLATES" are playing highly important parts in the never ending drive to reduce maintenance costs.

Study the accompanying drawing. The contact areas at top and bottom are wide. The grooves provide for the retaining of ample weld along the upper edges. The use of short bolts is practicable.

"WELD PLATES" are the strongest and most up-to-date plates rolled especially for electric weld joints.

Others like them; why not you?



W. H. 510-A Motor

# Gear Cases that reduce "Pull-Ins"

Gear troubles keep cars in shops eating up profits when they should be out in scheduled service. It's a long step toward economic operation when gears are protected with Chillingworth Drawn Steel Seamless Gear Cases. They qualify 100% as the ideal gear case. Their one-piece construction, with *overlapping* joint between the two halves, absolutely prevents the entry of dust or the escape of grease. The extra tough elastic deep drawing steel, without parts to loosen and without seams to open up,—these features *give the utmost protection to gears*. They combine light weight with great strength and toughness—the essentials that make for low maintenance.

Ask any of the nation-wide users of Chillingworth Gear cases about their superior merits.

## Chillingworth Manufacturing Co.

Jersey City, N. J.

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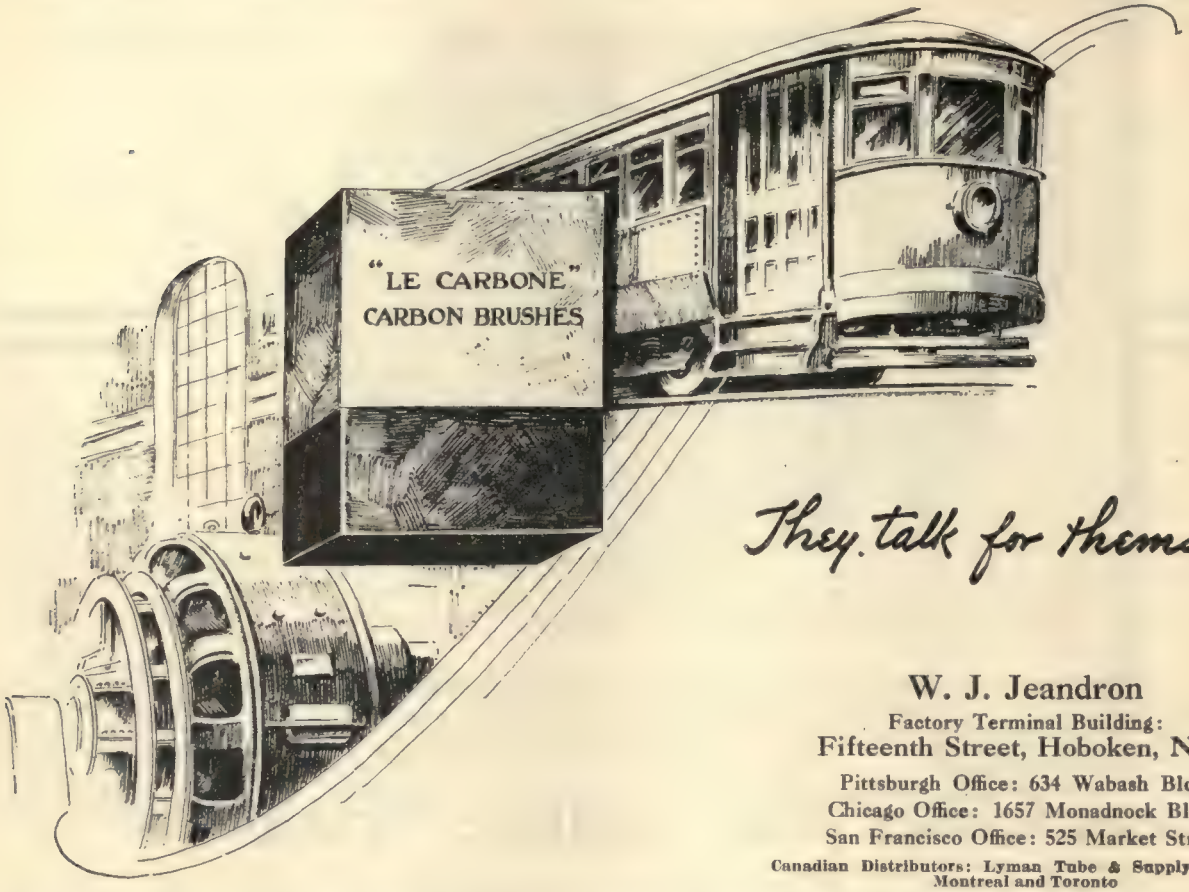


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For the wife, of course.

The wife's reply to the slightest request for information is "I must ask my husband."

You will quickly say that this is very inconvenient when you need an answer.

Sure it is, but yet you will ask some bewildered carbon brush salesman what grade of brush you need to correct a specified trouble, and when he replies "I must ask our engineers" you calmly wait.

So Morganite insists that its representatives have (a) the engineering knowledge and (b) the freedom of action to give you the answer—right off the bat.

(C?)

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## Reduce the cost of Maintenance of Equipment—

by helping to prevent accidents and wrecks! Especially at switches on high speed lines they give the utmost safety. Efficient springs allow cars to pass through the switch but always return the points tightly to original setting. The conspicuous target, rigidly connected to the switch points, indicates positively their position, either open or closed or danger if a switch point is held partially open by an obstruction. Made in various styles and sizes. Send for complete information.

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# *Works instantly when needed!*

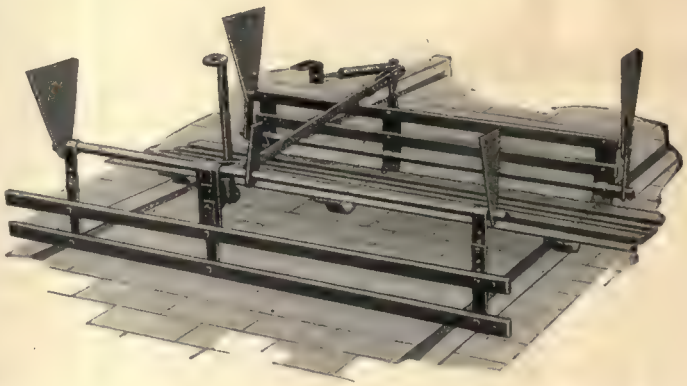
Minimize the possibility of serious accident! Equip your cars with the life guard that works instantly when needed—

# ROOT

## SPRING LIFE GUARDS

They are different from any other guard on the market. They will not rattle down—*they can't.* They are the lightest—the strongest—the simplest—the best working—and have the least upkeep.

Write for detailed information today! Or we will ship one on approval, at no expense to you if not satisfactory.



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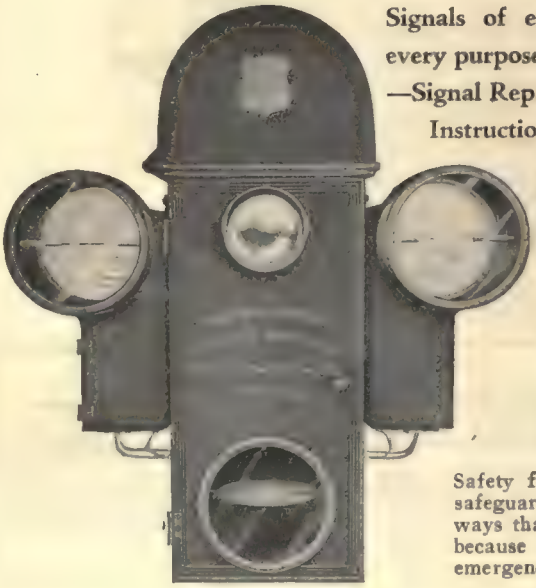

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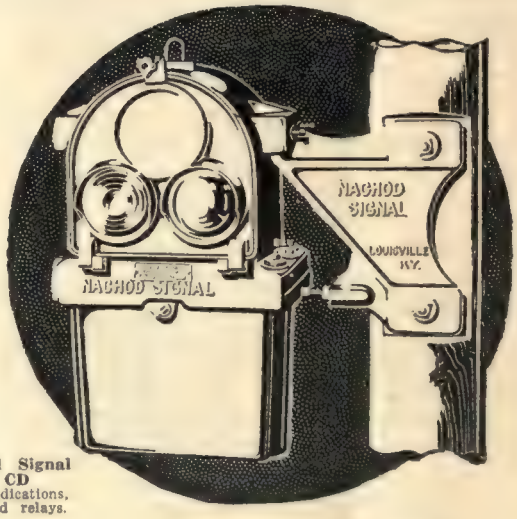


Nachod Signal Type CD Compact indications, oil immersed relays.

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Safety for your passengers with a signal system incorporating every known safeguard against failure. Safety without sacrifice of the speed and short headways that modern service demands. Safety too in the remote event of trouble, because we make a special point of being always ready to deal promptly with emergency calls for complete units, parts or repairs.

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*English Representative*—Forest City Electric Co., Ltd., Manchester, Eng.

*Nick Lynt says—*

N-L

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The installation of the N-L Heater includes the N-L Ventiduct, the all weather Cowl Ventilator. On hot sultry, rainy days of early spring and late fall, rain prevents the opening of the ordinary cowl ventilator, yet the driver's feet burn up. The open Ventiduct furnishes a strong flow of air into the cowl, yet prevents any weather from entering.—A life saver for the driver.

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"Yes we have solved some tough ventilation problems in our time, and the more we solve, the more we are able to solve. Even though yours looks like the worst yet, give us a chance at it—any kind of ventilation."

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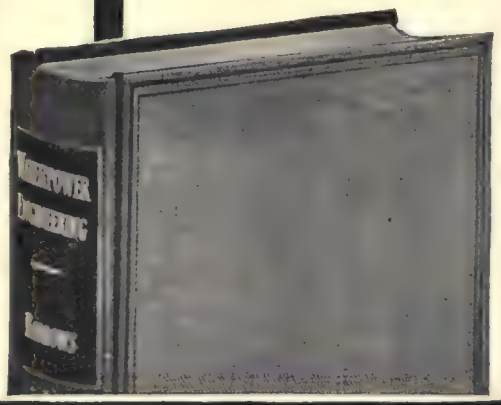

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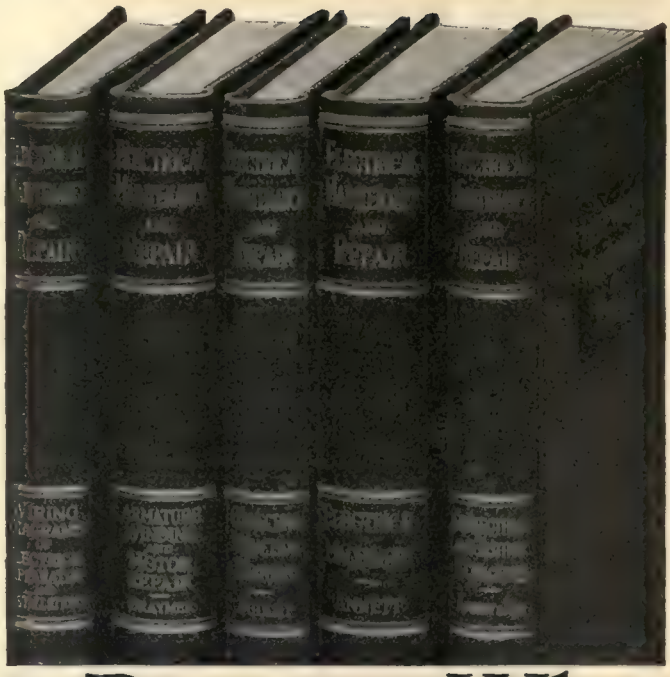

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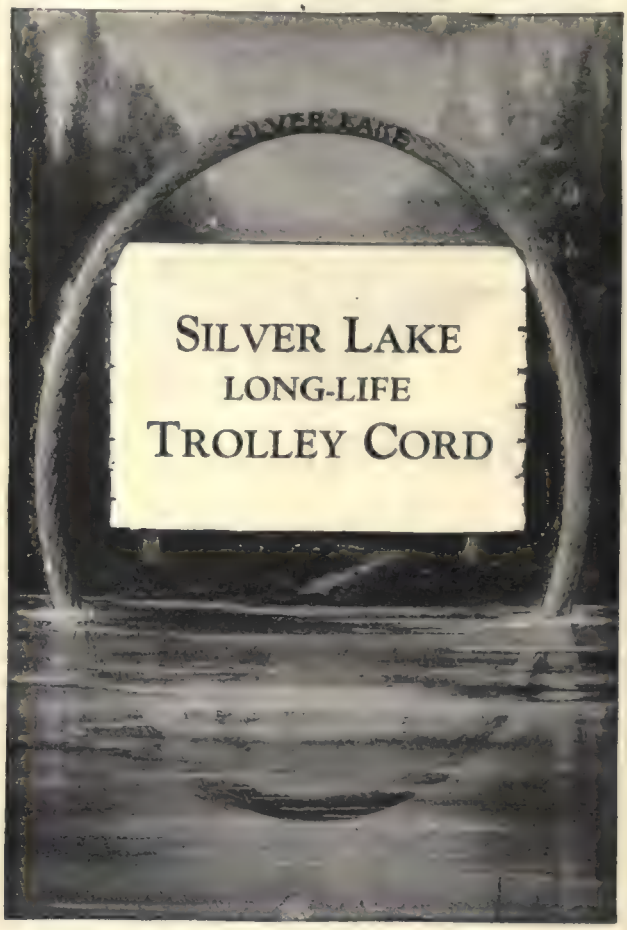


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Westinghouse Tr. Br. Co.

**Brake Lining, Asbestos**
Johns-Manville Corp.
American Brake Materials Corp.

**Brake Shoes**
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

**Brake Testers**
National Railway Appliance Co.

**Brakes, Brake Systems and Brake Parts**
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.

**Brakes, Magnetic Rail**
Cincinnati Car Co.

**Brick, Paving**
National Paving Brick Mfrs. Ass'n.

**Brick, Vitrified**
National Paving Brick Mfrs. Ass'n.

**Bridges, Steel**
American Bridge Co.

**Brushes, Carbon**
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co.
Stackpole Carbon Co.
Westinghouse E. & M. Co.

**Brushes, Graphite**
Morganite Brush Co.

**Brush, Wire, Pneumatic**
Ingersoll-Rand Co.

**Brushholders**
Columbia Machine Works & M. I. Co.
Eureka Copper Prod. Co.

**Building Materials, Fireproof**
Johns-Manville Corp.

**Buildings, Steel**
American Bridge Co.

**Bulkheads**
Haskelite Mfg. Corp.

**Bunkers, Coal**
American Bridge Co.

**Bus Heaters**
Nichols-Lintern Co.

**Bus Lighting**
National Railway Appliance Co.

**Buses**
Brill Co., The J. G.
Cummings Car & Coach Co.
Graham Bros.
International Harvester Co.
St. Louis Car Co.
White Co., The
Yellow Truck & Coach Co.

**Bushings, Case Hardened and Manganese**
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

**Cables (See Wires and Cables)**

**Cambric Tapes, Yellow and Black Varnished**
Irvington Varnish & Ins. Co.
Mica Insulator Co.

**Carbon Brushes (See Brushes, Carbon)**

**Car Lighting Fixtures**
Elec. Service Supplies Co.

**Car Panel Safety Switches**
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

**Car Steps, Safety**
Cincinnati Car Co.
Irving Iron Works Co.

**Car Wheels, Rolled Steel**
Bethlehem Steel Co.

**Cars, Dump**
Brill Co., The J. G.
Differential Steel Car Co.
St. Louis Car Co.

**Cars, Gas-Electric**
Brill Co., The J. G.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Cars, Gas, Rail**
Brill Co., The J. G.
St. Louis Car Co.

**Cars, Passenger, Freight, Express, etc.**
Amer. Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Wason Mfg. Co.
Perly A. Thomas Car Works Co.

**Cars, Second Hand**
Electric Equipment Co.

**Cars, Self-Propelled**
Brill Co., The J. G.
General Electric Co.

**Castings, Brass & Bronze**
A. Gilbert & Son Brass Fdry. Co.

**Castings, Brass Composition or Copper**
A. & J. M. Anderson Mfg. Co.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Drew Elec. & Mfg. Co.
Eureka Copper Prod. Co.
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**
American Brake Shoe & Fdry.
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.
Wm. Wharton, Jr. & Co., Inc.

**Castings, Malleable & Brass**
American Brake Shoe & Fdry.
Bemis Car Truck Co
Columbia Machine Works & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers, Trolley**
Earll, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

**Catenary Construction**
Archbold-Brady Co.

**Ceiling Car**
Haskelite Mfg. Corp.
Pantasote Co., Inc.

**Ceilings, Plywood Panels**
Haskelite Mfg. Corp.

**Cements, High Temperature**
Johns-Manville Corp.

**Chafing Plate**
Manganese Steel Forge Co.

**Change Carriers**
Cleveland Fare Box Co.
Electric Service Supplies Co.

**Change Trays**
Cincinnati Car Co.

**Circuit-Breakers**
A. & J. M. Anderson Mfg. Co.
General Electric Co.
Roller-Smith Co.
Westinghouse E. & M. Co.

**Circuit Breakers (Oil)**
American Brown-Boveri Elec. Corp.

**Clamps and Connectors for Wires and Cables**
Dossert & Co.
Electric Railway Equipment Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Eureka Copper Prod. Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

**Cleaners and Scrapers, Track (See also Snow-Plows, Sweepers and Brooms)**
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Root Spring Scraper Co.
St. Louis Car Co.

**Clusters and Sockets**
General Electric Co.

**Coal and Ash Handling (See Conveying and Hoisting Machinery)**

**Coil Banding and Winding Machines**
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

**Coils, Armature and Field**
Columbia Machine Works & M. I. Co.
Economy Elec. Devices Co.
Elliot-Thompson Elec. Co.
General Electric Co.
Westinghouse E. & M. Co.

**Coils, Choke and Kicking**
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

**Coin Changers**
Illinois Motive Equipment Co.

**Coin Counting Machines**
Cleveland Fare Box Co.
International Register Co.
Johnson Fare Box Co.

**Coin Sorting Machines**
Cleveland Fare Box Co.

**Coin Wrappers**
Cleveland Fare Box Co.

**Commutator Slotters**
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

**Commutator Slotting Equipment, Hand & Motor-Driven**
Martindale Elec. Co.

**Commutator Stones**
Martindale Elec. Co.

**Commutator Truing Devices**
General Electric Co.

**Commutators or Parts**
Cameron Elec'l Mfg. Co.
Columbia Machine Works & M. I. Co.
Eureka Copper Prod. Co.
General Electric Co.
Westinghouse E. & M. Co.

**Compounds, Insulating**
Johns-Manville Corp.

**Compressors, Air**
General Electric Co.
Ingersoll-Rand Co.
Sullivan Machinery Co.
Westinghouse Tr. Br. Co.

**Compressors, Air, Portable**
Ingersoll-Rand Co.
Sullivan Machinery Co.

**Compressors, Gas**
Sullivan Machinery Co.

**Condensers**
General Electric Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

**Condenser Papers**
Irvington Varnish & Ins. Co.

**Conduit Duct Underfloor**
Johns-Manville Corp.

**Conduits, Fibre**
Fibre Conduit Co.
Johns-Manville Corp.

**Connectors, Solderless**
Dossert & Co.
Westinghouse E. & M. Co.

**Connectors, Trailer Car**
Columbia Machine Works & M. I. Co.
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

**Controllers or Parts**
Eureka Copper Prod. Co.
General Electric Co.
Westinghouse E. & M. Co.

**Controller Regulators**
Elec. Service Supplies Co.

**Controlling Systems**
General Electric Co.
Westinghouse E. & M. Co.

**Converters, Rotary**
General Electric Co.
Westinghouse E. & M. Co.

**Conveying & Hoisting Machinery**
American Bridge Co.

**Copper Wire**
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

**Copper Wire Instruments Measuring Testing and Recording**
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

**Cord, Bell, Trolley, Register**
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., J. A.
St. Louis Car Co.
Samson Cordage Works
Silver Lake Car Co.

**Cord Connectors and Couplers**
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

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American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

**Cowl Ventilators**
Nichols-Lintern Co.

**Cranes, Hoist & Lift**
Eureka Copper Prod. Co.
Electric Service Supplies Co.

**Cross Arms (See Brackets)**

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International Steel Tie Co.

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Wm. Wharton Jr. & Co., Inc.

**Crossing, Frog and Switch**
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

**Crossing Manganese**
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

**Crossings, Track (See Track Special Work)**

**Crossings, Trolley**
Ohio Brass Co.
Westinghouse E. & M. Co.

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Central Alloy Steel Corp.

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O. M. Edwards Co., Inc.
Pantasote Co., Inc.
St. Louis Car Co.

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Elec. Equipment Co.
Van Loan Corp., Irving S.

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Ramapo Ajax Corp.

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Electric Service Supplies Co.

**Detective Service**
Wish-Service, P. Edward

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Cincinnati Car Co.
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

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Brill Co., The J. G.
Cincinnati Car Co.
O. M. Edwards Co., Inc.
General Electric Co.
Hale-Kilburn Co
St. Louis Car Co.

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National Pneumatic Co., Inc.
Safety Car Devices Co.

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Gallmeyer-Livingston Co.

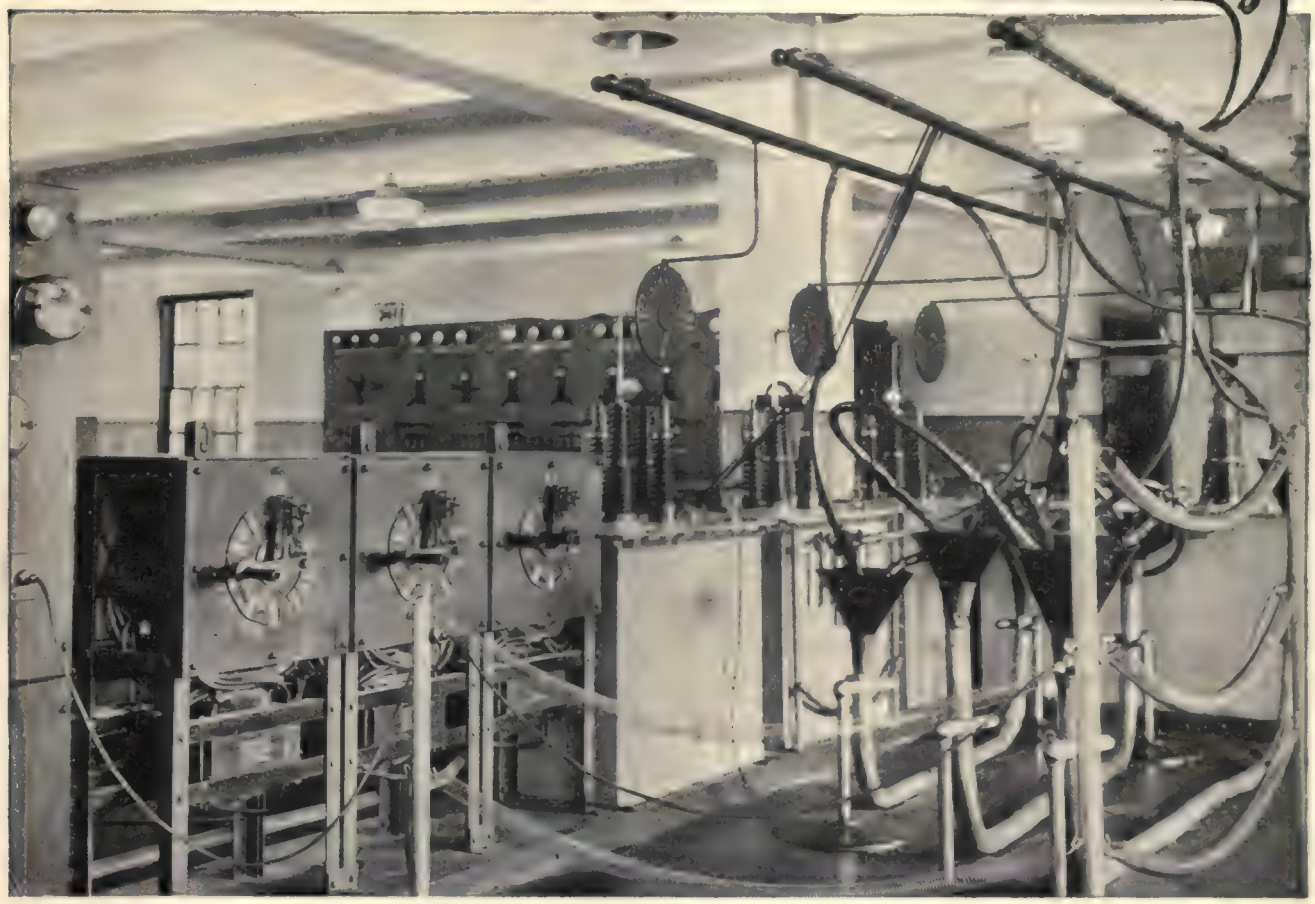
**Drills, Rock**
Sullivan Machinery Co.

(Continued on Page 156)

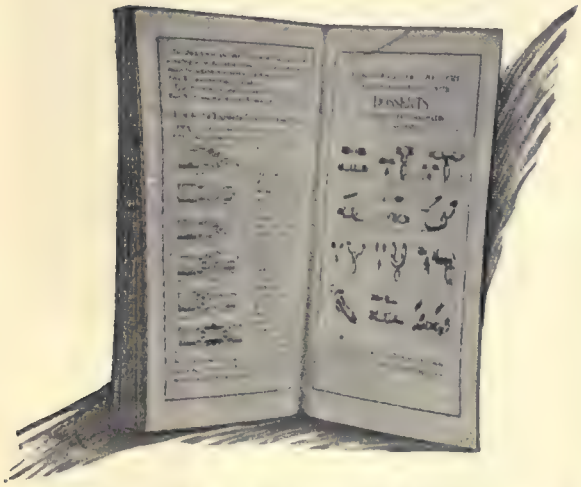
# Memo:

*The transformer taps, cable end connections and bus connections are made with . . .*

DOSSERTS



*—in this new department of a large Eastern Utility*



In any indoor or outdoor station, in any distribution or industrial wiring job where branches are connected to mains, where straightaway or T's or Y's or deadend connections are modern . . . . . DOSSERTS.

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Railway Trackwork Co.
**Grinders, Portable Electric**
Railway Trackwork Co.
**Grinding Bricks and Wheels**
Railway Trackwork Co.
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Smith Heater Co., Peter
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**Jacks, Horizontal**
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**Jacks, Lifting**
Duff Mfg. Co.
**Jacks, Pipe Forcing**
Duff Mfg. Co.
**Jacks, Pole**
Duff Mfg. Co.
**Jacks, Push and Pull**
Duff Mfg. Co.
**Jacks, Special Purpose**
Duff Mfg. Co.
**Jacks, Track**
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St. Louis Car Co.
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Electric Service Sup. Co
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Hubbard & Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
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**Locomotives, Electric**
American Brown-Boveri Elec. Corp.
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General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.
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Universal Lubricating Co.
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Texas Co.
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**Manganese Parts**
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Manganese Steel Forge Co.
**Manganese Steel Castings**
Wm. Wharton, Jr. & Co., Inc.
**Manganese Steel Guard Rails**
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.
**Manganese Steel, Special Track Work**
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.
**Manganese Steel Switches, Frogs and Crossings**
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.
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**Mica**
Mica Insulator Co.
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**Motor and Generator Sets**
American Brown-Boveri Elec. Corp.
General Electric Co.
**Motor Leads**
Dossert & Co.
**Motors, Electric**
General Electric Co.
Westinghouse E. & M Co
**Motorman's Safety Mirrors**
Drew Elec. & Mfg. Co.
**Motorman's Seats**
Brill Co., The J. G.
Cincinnati Car Co.
Electric Service Sup. Co.
Hale-Kilburn Co
Heywood-Wakefield Co.
St. Louis Car Co.
Wood Co., Chas N
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Bethlehem Steel Co.
Cincinnati Car Co
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De Laval Separator Co.
**Oil Reclaiming Devices**
Skinner Automotive Devices Co.
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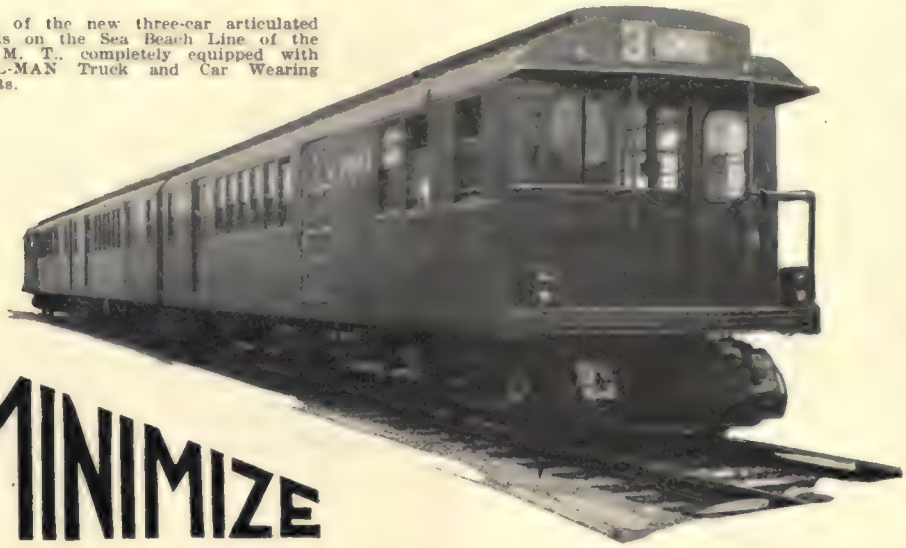

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*No.* 13

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## Ask the Railway Man Another!

WITH the cessation of Mah Jong activity and a decline in the cross-word puzzle pastime, the faddists are now engrossed in the game of "Ask Me Another." Over the after-dinner coffee cups a thirst persists not for mere food and drink but for a knowledge of the men and women who were influences in ancient and medieval times. A feature of this new obsession is the inevitable disclosure of how little is known about politics, books, anatomy and points of general information.

If Messrs. Spafford and Esty had included a questionnaire on modern developments in local transportation, what per cent would you have made? What are the most recent transportation sales ideas, developments in car design, the operating records of representative properties, achievements in the promotion of safety and training in courtesy?

Ask any consistant reader of Electric Railway Journal about new developments in his industry. He is posted up to the minute!

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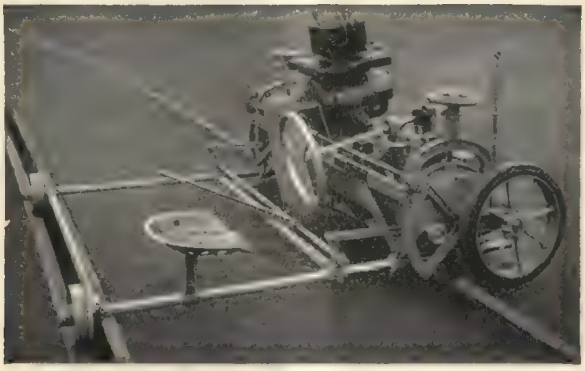
SAVING THE RAIL SAVES THE RAILWAY

# *A Grinder you can keep busy*



# Improved Atlas Rail Grinder

The Improved Atlas does everything that could be done by our former standard Atlas Rail Grinder and our Universal Rotary Track Grinder—and offers important advantages not possessed by these older types, manufacture of which has been discontinued.

Like the old Atlas, it has the tilting grinding wheel but the tilting mechanism is simpler and easier to operate. Turning the small hand wheel tilts the grinding wheel to the desired angle—no nuts to loosen. And you don't have to stop the machine to tilt the grinding wheel.

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SAVING THE RAIL SAVES THE RAILWAY

O-B ENDURANCE IS SERVICE INSURANCE

O-B Type "E" Live Adjustable Cross-Over for 30 to 90 degree angles, (Catalog page 579)

# Makes Crossings Quiet —Prevents Arcing

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Eliminate the arcing and pounding of trolley wheels at crossings and you not only lower operating and maintenance costs, but give car riders more pleasing service, for the resounding hammer blow of the trolley wheel at special work is annoying to passengers.

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**O-B CAM TIPS**
**(Renewable Bronze)**

Cam Tips afford an unusually smooth approach to malleable iron special work. They are easily and quickly installed and never become loose or troublesome on the wire. Cam action of the tip holds wire firmly in bottom of groove and prevents slipping of wire or creeping of cross-over. When worn they may be renewed, without displacing the wire or the need of special work. O-B Cam Tips are incorporated in the design of all the latest type trolley frogs and crossings.

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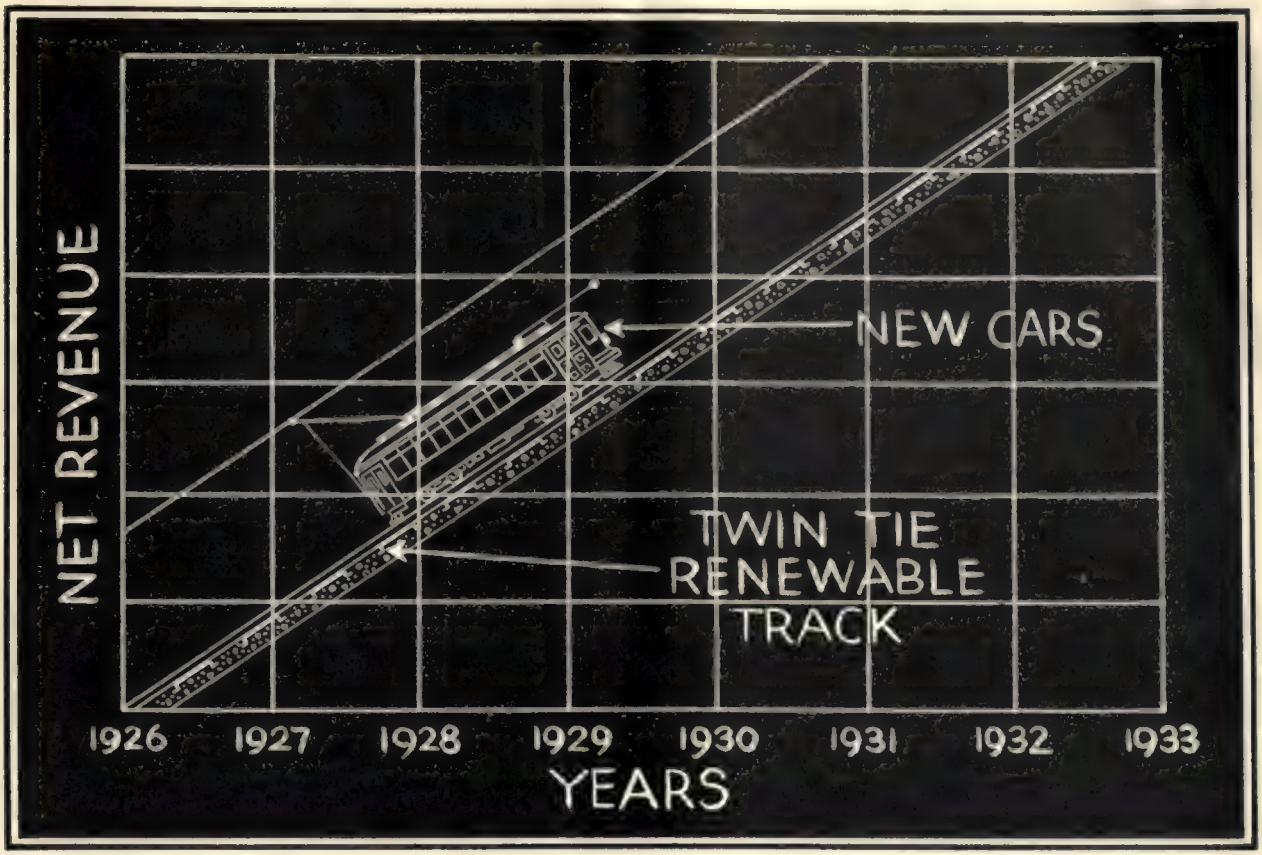


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## with New Cars and Renewable Track—

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***We make the equipment which makes the Safety Car.***

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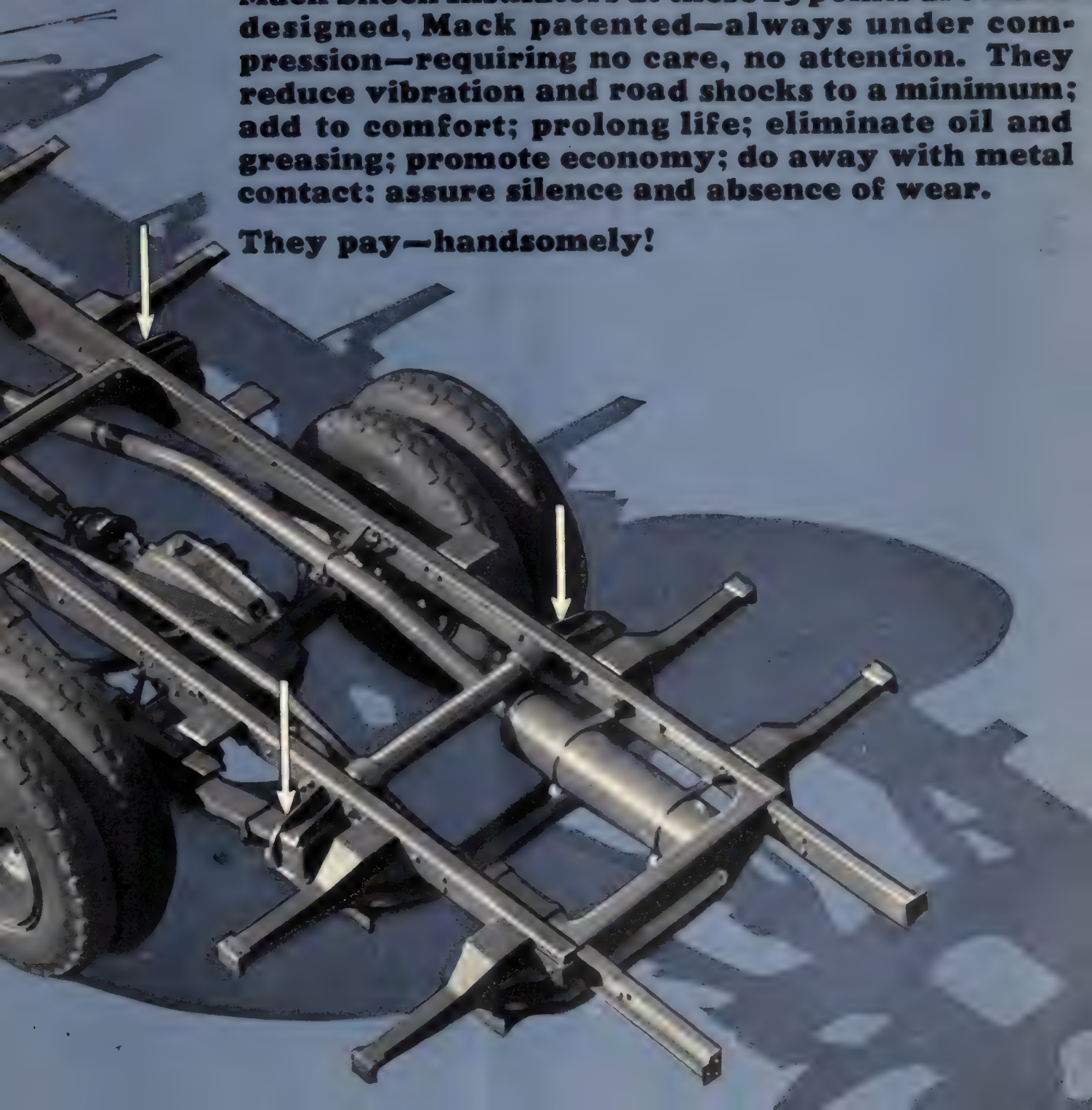
**They pay—handsomely!**



The New England Transportation Company—Subsidiary of the N.Y.,N.H. & H. R.R.—repeat again on Mack Buses in their latest purchase.

# How Fortunate That Operator—

**Operators who know buses have had experience. They have operated buses of different makes under the same conditions; same grade of drivers—same road factors—same shop maintenance—same weather influences. They know by comparison.**

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**Go to the operator who has used Macks—and others. He will tell, you better than we can, why Macks are preferred.**

## Mack Trucks, Inc.

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*A step ahead of the modern trend*

# of consistent effort to establish a successful principle of modern car *building*

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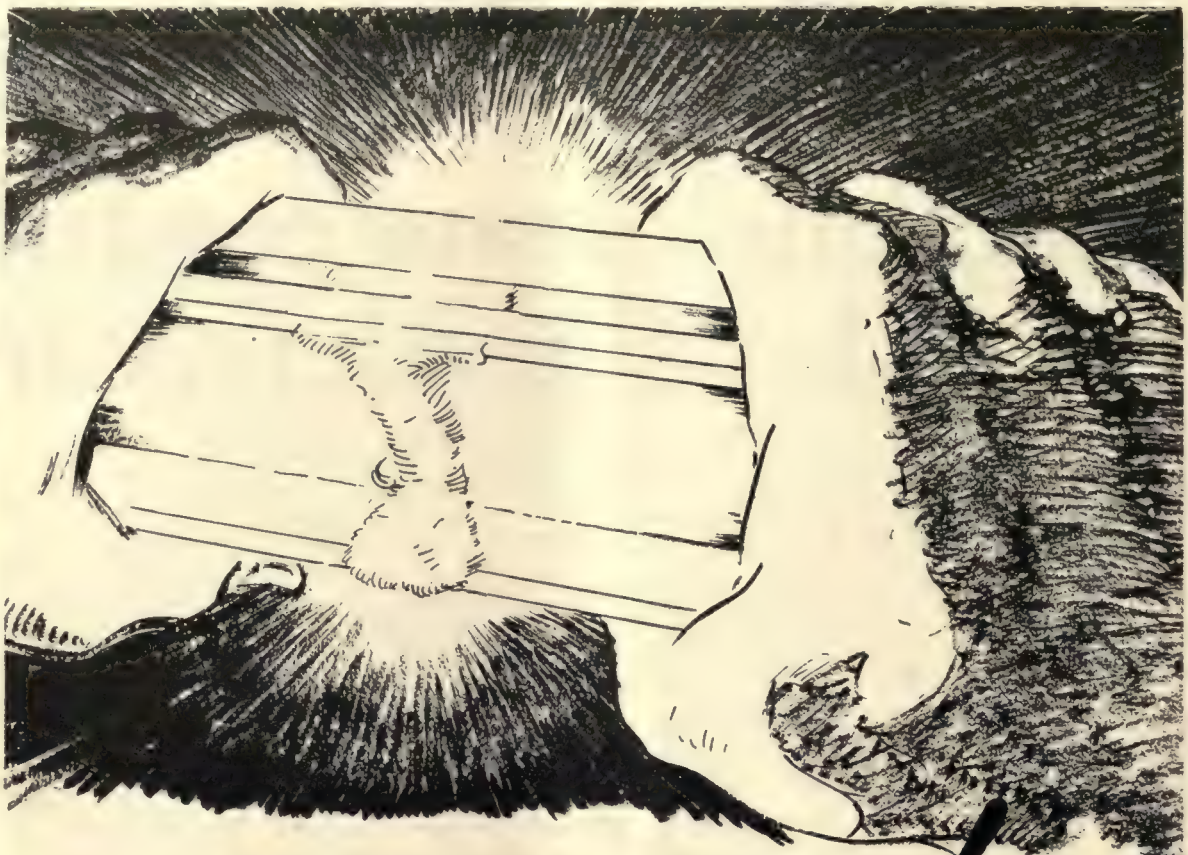
Space forbids greater detail in these pages, but we will gladly go into the matter from A to Z with any interested electric railway executive.

CINCINNATI CAR COMPANY
Cincinnati, Ohio

CINCINNATI New CARS



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BELL LONG DISTANCE SERVICE

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*Reduces tire wear and expense to a minimum.*

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Thirty-three more ultra-modern cars, ***every one G-E equipped***, are now being operated:

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This is an important forward step in the much-needed standardization of electric rolling stock. It is an instance of how the adoption of G-E Modern Car Equipment goes hand in hand with the growing desire to obtain the advantages of modern cars.

Recognizing that the modernization of car equipment is one of the most profitable and stabilizing opportunities open to the industry today, General Electric is giving a large measure of attention to this subject. Its engineers will co-operate in the production of modern motive power that will insure the maximum success of your modern cars.

**The average citizen, noting attractive, up-to-date cars on his electric railway, visualizes a transportation service that is comfortable, speedy, and satisfactory—and progressive. Such is the personal reaction that makes patrons and friends.**

330-24

# GENERAL ELECTRIC

# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

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CHARLES GORDON, *Editor*

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## Two Developments that Mark Fundamental Progress

IMPORTANT places in the archives of transportation are destined for two achievements reported in this issue. One, the introduction of the articulated car into high-speed interurban service by the Washington, Baltimore & Annapolis Electric Railroad, is a development that at once makes a bid for increased patronage and reduced operating cost. Nothing has been spared to provide comfort of riding. This is brought out in the text and views of the cars in service. Yet, due to fundamental features of design, a 27 per cent weight saving was possible. Two men perform the work with greater ease than do three on a two-car train, and maintenance costs will be reduced because of the fewer number of units of apparatus to inspect and keep up.

The other event in the march of progress is the approaching début of the Springfield, Mass., car designed for city service. To be sure, it is still in the embryo stage, but it has great promise. Its conception grew out of the increasing desire to try out some of the plans the industry has talked about for many years. Finally, some two years ago C. V. Wood, president, and W. L. Harwood, chief engineer of the Springfield Street Railway, listed what in their opinion were the objectionable features of the design used universally in this country. On another sheet they listed the things that should be accomplished.

Then they began to build. Plans were made and immediately scrapped in favor of other plans destined to meet the same fate. Dozens of manufacturers were consulted. Finally, through the persistence of these Springfield executives, two trucks very different in appearance from the older types began to emerge, and steel and aluminum and wood shapes began to take the form of a car body also very different from that usually observed. The trucks are now complete and after many trials and changes the apparatus is being mounted.

While the proof of the pudding is in the eating, as the two Springfield men have emphatically stated, success has been attained in many of the aims set down two years ago. The car, accommodating 45 people in comfortable, amply spaced seats, will weigh something less than 24,000 lb. The body is attractively finished and is essentially an improvement in appearance, in the opinion of many who have viewed it in the state of partial completion. With the radical changes adopted in the truck material reduction of noise may be expected.

Coincident with this story of the Springfield car comes the announcement of the purchase for the electric railways at Springfield and Worcester of 100 new cars which do not embody the experimental features. It is to be regretted that the new design has not had a year or more of experience behind it so that it could have been adopted for this order. However, because of promises made by the New Haven Railroad at the time of its re-entry into the management of these two properties to effect an immediate improvement of rolling stock, it was considered inadvisable to postpone construction.

These two developments, one on the W., B. & A., the other at Springfield, are specific examples of the faith that large financial interests have in the future of the industry. They are not shaken in their belief that rail transportation never will become a thing of the past. But these events do denote the insistence of owners and operators that radical improvements must be made to compete with modern conditions. In the past the industry has not so much lacked in possibilities as in imagination and courage to progress.

## An Excellent Measure Defeated After the Battle Was Won

PHILADELPHIA'S city government and the various local civic and merchants' associations were commended in the issue of this paper for Jan. 22 for the progressive spirit shown in adopting a sweeping no-parking ordinance for the downtown section. Now, unfortunately, it is necessary partially to retract the words of praise. For the City Fathers of the Pennsylvania metropolis have suffered a change of heart.

Startling charges have been registered against the no-parking ordinance by the Market Street and Arch Street Merchants' Associations and by certain organizations of motorists. Individual business men along Market Street, the principal shopping thoroughfare, declared that inroads have been made into their respecsive businesses, varying from 10 to 40 per cent. Some of the wealthier residents of the city have been heard to declare that they would rather have their chauffeurs drive them to New York, if necessary, so that they can park when and where they want to and for as long a time as they please!

When the original ordinance was passed Council voted unanimously to give the plan a fair trial. All objections by the merchants were temporarily stilled and it seemed that conditions were propitious for a valuable and revealing demonstration of the benefits accruing to the municipality and business men alike through relief from serious traffic congestion in the central delivery district.

But a wave of hysteria swept the merchants. Naturally many people who for years have been accustomed to use the city streets for free garage space set up a loud clamor against this "infringement" of their rights. Be it to the credit of Director of Public Safety Elliott that the ordinance was enforced fairly and impartially in practically every instance. So those who consider that they have an inalienable right to special privilege had their sense of the eternal fitness of things sadly wounded. Then, too, the no-parking ordinance was put into effect immediately following the holiday

season. Business was naturally slack after the Christmas rush and many merchants unthinkingly placed the full responsibility for this condition at the door of the no-parking enforcement.

Violent agitation for a return to limited parking became the order of the day. The Committee on Public Safety was besieged with petitions and its public hearings were crowded with loud-speaking merchant representatives. Vainly did Director Elliott point out that limited parking was a physical impossibility without a considerable increase in the police force, that any weakening at this time meant a return to the old vice of the parking hog. Members of Council found it expedient to lend a sympathetic ear to the tearful tale of woe poured forth by the most prominent business men of the city. An amended ordinance was passed by the Council on March 24.

## Those Who Defeated the Measure Will Find Themselves the Chief Losers

SO PHILADELPHIA is to have one-hour parking again on several important down-town streets. The boundaries of the restricted area have been moved in, so that parking is not to be prohibited over as wide a section as was first planned. True, the streets will presumably be swept clear during the morning and evening rush hours. But after 9:30 a.m. and before 5 p.m. it is to be feared that the old, old story will be told on Market, Arch and Broad Streets.

Back in their chairs the merchants will lean, with the comfortable feeling that they have scotched the transportation company and handily turned the tide in favor of themselves. But who have been the principal losers by this move? Who but the very merchants that have so persistently failed to look beyond the ends of their own noses? Every year more and more people have become disgusted with the intolerable congestion of traffic in the downtown area and have resolved to go to almost any lengths to avoid the mental and physical anguish incident to shopping in the center of the city. These people are ripe for picking by the neighborhood stores and the outlying shopping centers. Surely this class of shoppers constitutes a much bigger loss to the downtown merchants than the comparative few that have considered themselves injured by the recent legislation.

Relatively few shoppers can find, or ever could find, parking space for their automobiles on the narrow streets of downtown Philadelphia. Much of the limited space available is taken up by the clerk or other individual who usurps the space in front of the store in which he is employed—space which the store owner thinks is being used by his customers. Charles Hall, president of the Council, and Director Elliott have both predicted that it will not be long before the merchants wake up and realize that they have been deafened by their own oratory and confused by the false brilliance of their own theories of automobile shopping. Even now a large group of merchants have steadfastly refused to be carried away by the importunings of their fellows and have come right out in meeting with statements to the effect that strict no-parking enforcement is necessary and desirable. And the Automobile Club of Philadelphia has taken a similar stand.

As for Philadelphia, it started out bravely to move mountains and now wakes to find itself dealing in anthills.

## Co-operation Will Bring Insurance Improvement

WORK which has been done over a period of several years by the insurance committee of the American Electric Railway Association typifies the character of activity in which an association committee can bring about material savings for members by acting as a clearing house for the interchange of data and experience.

Co-operation by member companies is essential to the success of such a committee's work. Of necessity it is dependent for its studies on information furnished by operating companies in answer to its inquiries. Unless such inquiries are answered completely, work of the committee is seriously curtailed.

This year the insurance committee is broadening its activity. It is not only interested in gathering fire loss statistics, so as to check up insurance rates directly, but is likewise endeavoring to stimulate the adoption by member companies of approved fire prevention measures which will reduce the fire hazard.

Questionnaires which were sent out some time ago are being compiled. The information developed is to be presented in the committee's report. This may be made complete or incomplete, depending on the degree to which operating companies furnish the necessary data. In order that the work of the committee may be the means for bringing about substantial improvement in the insurance situation, operating companies which have not answered the questionnaire will render a service both to the industry and themselves by sending in at once the information requested.

## Appreciative Newspaper Comment Is Valuable to Railway Companies

SYMPATHETIC understanding of the problems of the electric railways is by no means uncommon among the daily press. This, of course, excludes from the list of commentators papers that never have anything but an axe to grind. The influence of such sheets will always be a subject of speculation, but there can be no question about the power for good of the best of the dailies. So in saying as it did, in a recent case in which fares were increased in an Eastern city, that the commission recognized a transportation and economic development familiar to every observing citizen in the present era of automobile competition, the paper in which this expression appeared put itself forcibly on record as recognizing this same condition.

The paper was not in full agreement with the schedule of rates authorized by the commission. It felt, for instance, that the short-haul rider had been penalized to the disadvantage of the company's revenues, but it did say in simple justice to the railway that "it has been struggling, like all other corporations of the same class, not only against tremendous difficulties, due to the automobile drain, but also against municipal exactions, in the way of taxation, that greatly handicap it in the resulting competition." There is no doubt that the paper did the city a real service in characterizing as fantastic the talk of enforcing the 5-cent fare condition of the original franchise grant. Of course, the courts have repeatedly ruled that, franchise or no franchise, electric railways cannot constitutionally be compelled to operate at a loss. It should be unnecessary to remind an intelligent community that the 5-cent fare was fixed in railway franchises at a time when operating costs, including wages, were radically dif-

ferent from what they are today, but it does seem necessary to repeat this truth again and again.

No sympathy was wasted by this commentator on the threat of retaliation against the local railway by the process of licensing buses to compete with the railway and "bring it to time." Very aptly it said, in substance, that, aside from the propriety of this kind of destructive revenge, its effect would be, not to restore 5, 6 or 7-cent fares, but to destroy railway service, the main reliance of the great bulk of the people. In that event the city would have to forfeit hundreds of thousands of dollars a year in franchise taxes and paving taxes or transfer the equivalent of these assessments to the bus companies. And the paper clearly sees that, in either event, the public would have nothing to show but a melancholy deprivation of railway facilities for its foolish experiment in municipal vengeance.

In thus ably presenting the case in its two editorials the commentator has done a real service to city officials, the public and the railway. No thoughtful, far-seeing citizen desires to cripple the corporate agency that furnishes to the city a considerable part of its daily transportation. On the contrary, that agency, having demonstrated its desire to carry on, must be sustained in every reasonable way. On its part, the city has the right to demand in return fair play to patrons, together with a demonstration by the railway of its sincerity in providing the highest grade of service that is possible under the particular economic limitations imposed.

## Safety Co-operation from the Top

WITH respect to the all-important subject of safety and accident prevention work, a new note is sounded in a recent article by A. W. Robertson, president of the Philadelphia Company, writing in the N.E.L.A. *Bulletin*. He says in part:

"In order to get the most out of safety devices and wise safety rules, it is absolutely essential that the individual be protected and that his co-workers and companions have the right mental attitude toward both of these and all other matters pertaining to safety. If the mental attitude is wrong, it is quite possible to almost defeat the effectiveness of both. Safety devices will compensate in some measure for faulty rules and appliances. Here is where the executive can help very materially. If he has no interest in safety, the chances are he will affect his immediate subordinate officers and they, in turn, will affect those directly under them to have a contempt and disregard for safety work. This attitude tends to put the brakes on every safety movement in the organization, although the subordinate may have ample safety devices installed and adequate rules promulgated."

With this approach to the safety problem, Mr. Robertson has unearthed one of the greatest stumbling blocks to a perfect safety organization. In a few words, he promulgates the axiom that pressure from the top is much more effective than pressure from the bottom. Also that pressure from the top and from the bottom exerted at the same time will eradicate any faults that may lie in the middle of the pile. The whole history of the safety movement is justification of the assertion that executive indifference has retarded and devitalized some of the best plans and most enthusiastic efforts for the conservation of human life in the industrial world.

Speaking very plainly, the JOURNAL has had the opportunity to see the effects of this executive indifference, or, what is worse, a mild display of enthusiasm that is a shadow instead of a substance. Those familiar with the safety movement will undoubtedly agree that accident statistics decrease in direct proportion to the percentage of workers, from president to office boy, that are sold on the movement.

## A Railway Operator Speaks Frankly

FRANK, indeed, were the remarks made before the recent meeting of the Illinois Electric Railway Association at Springfield, Ill., by J. R. Blackhall, vice-president and general manager Chicago & Joliet Electric Railway, regarding the manufacturers' responsibility for keeping abreast of the industry's present-day equipment needs. Some there may be who feel that Mr. Blackhall was unduly severe in his criticism, or at least neglected to give adequate credit for those improvements which have been made in electric railway equipment. Others might be inclined to hold that the speaker had overlooked the effect on car development of the buying habits of many operating companies. In this latter category would come the practice of buying cars to detailed specifications and the strong resistance encountered by manufacturers in the introduction of new devices.

But whether or not Mr. Blackhall recognized adequately the difficulties encountered by the car builders, the question of how to bring about car improvement merits more than passing consideration on the part of both manufacturers and operators. Electric railway equipment must be brought up to a level of attractiveness and performance that will meet present-day transportation standards, and the speed with which the industry may be expected to move forward into its proper place in the sun depends on the extent to which this is accomplished. It is indeed "a condition and not a theory that confronts us."

Just what is needed in the way of car improvements cannot be definitely cataloged. It would likewise be an ambitious undertaking to attempt to predict just what will form the developments of the next few years. But it is a simple matter to list the characteristics that are wanted in the car of the future. It must be faster; it must be more attractive to the eye and more comfortable to ride. Reduction of noise in operation is absolutely essential. It seems quite probable that this last requirement will lead to some fundamental changes in design. In fact, several interesting attempts to work out improvements in this direction are already under way. It was his own experience in the development of a truck with fully inclosed gears and spring suspended motors that led Mr. Blackhall to question the initiative of the car builders.

Frank discussion of a question so vitally important to the industry is decidedly helpful. Each day there is a growing inclination on the part of every one concerned to face the facts and to abandon the shackles of precedent and prejudice. The ultimate electric railway car will not be developed overnight. Mere changes do not necessarily constitute improvements. Failures and mistakes may be expected. In some cases the importance of making adequate provision for economical and rapid maintenance and repairs may be overlooked. But there seems to be no good reason why electric railway cars cannot be made as attractive to the public as any other vehicle on the streets. In fact, in comparison with the problems with which the bus designer must contend, the car builder's task is relatively simple.

# Fundamental Design Changes

## Feature Experimental Car at Springfield, Mass.

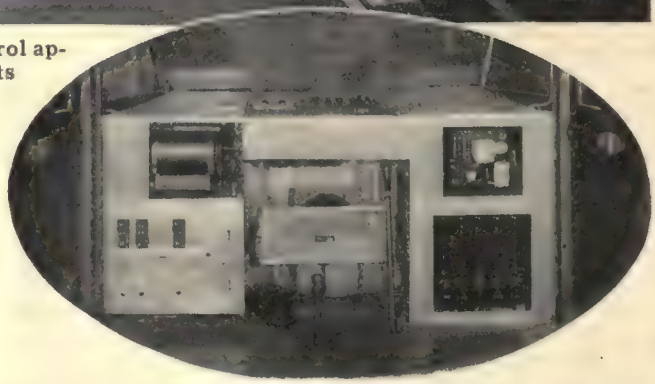
**Exterior lines of Springfield experimental car show many traces of motor bus influence**

Compound curves have been used freely to create a pleasing appearance. The wide sloping windshield is an innovation in street car design. Doors will be painted to conform to general color scheme.

**Inclosed Worm Drive from Four High-Speed Motors Mounted on Truck Frames, Tapered Roller Bearings and Internal Expanding Brakes Are Expected to Reduce Noise and Vibration—Combination Wood and Duralumin Streamline Body Has Rakish Appearance**

**All switches and control apparatus are in cabinets at ends of car**

Air piping on the platform has been replaced by electric wiring. Covers are removed in this and other views shown. Treadle step is seen at the left. Floor will be covered with linoleum.



Handle of the master controller with horizontal drum, seen at the left, moves in a vertical plane. Automobile type lever at right is for emergency braking. The post in the foreground supports the operator's seat.

PRECEDENT has been cast aside in the design of a new car by the Springfield Street Railway, Springfield, Mass., and a vehicle has been developed which differs in many important respects from any hitherto operated by electric railways in this country. The object has been to build a car lighter, faster and more comfortable than those now in use. The outward appearance of this new car is novel, but not so much so as the design and arrangement of the equipment. This has been accomplished not by camouflaging an old design but by adopting an entirely new one. Many ideas borrowed from the automobile industry have been incorporated. Special effort has been made to reduce noise and vibration. To this end radical departures have been made from established practice in truck design. The practicability of the many innovations will be thoroughly tried out in a series of tests.

The idea of building a car radically different from any previously operated was conceived several years ago by Clark V. Wood, president Springfield Street Railway and Worcester Consolidated Street Railway. Because comparatively few major changes had been made in street car design in many years, he believed that this vehicle had come to be considered by the public as antiquated. The tremendous increase in the use of automobiles had accustomed people to many refinements not incorporated in the usual type of street car. He determined, therefore, to undertake the construc-

The deep-cushioned seats are upholstered in dark brown Spanish leather

tion of a car that would be far in advance of present practice. The work of designing the vehicle was intrusted to W. L. Harwood, engineer of power and equipment for the Springfield and Worcester railways.

After careful consideration of the problem, it was decided that efforts should be directed particularly toward reducing noise and vibration and toward giving the car an attractive appearance. It was thought that the journal bearings should be of the so-called frictionless type, which would be possible if the motors were spring supported instead of being dead weights on the axles. Gears should be of a design that would cut down noise and permit the use of higher speed motors. Brakes should be of the internal expanding type, eliminating the rattle of levers and rods. Interior fittings, seats, lighting, etc., should be made more attractive. In place of a bell or whistle, the car should be equipped with a warning signal having a more agreeable sound.

### Novel Features in Truck Design

Numerous unusual features have been embodied in the truck design. Dished steel wheels of 26-in. diameter are mounted on differential axles of the automobile type, which revolve on tapered roller bearings arranged as shown in an accompanying drawing. The truck is of steel with I-beam side frames inside the wheels. The wheelbase is 6 ft. Coil bolster springs carry the weight of the car body up to three-quarters of the seated load. In addition semi-elliptic springs mounted in seats provided with Mack rubber shock insulators are in use at all times. This truck design is a joint development of the Wason Manufacturing Company, the Timken-Detroit Axle Company and the Springfield Street Railway.

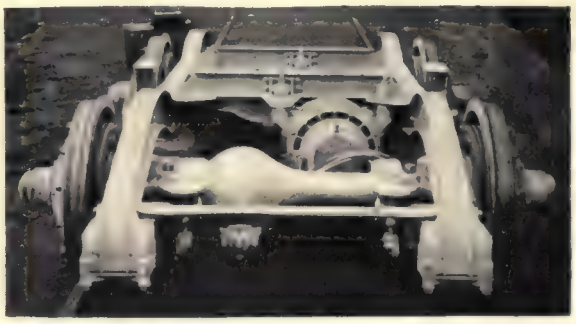
Each of the trucks carries two Westinghouse V91B, 300-volt motors, connected permanently in series. Variation in speed is obtained by placing the pairs in series and in parallel. Each motor is attached through rubber blocks to the truck frame with its shaft parallel to the direction of motion of the car. It is connected to the remote axle of the truck through a flexible Spicer propeller shaft. The gear reduction is 10 to 1, permitting the use of small high-speed motors, weighing 424 lb. each. The worm drive operates in a bath of oil. Universal joints between the motor and the axle permit placing the motors well up on the truck frame, where they will be out of the way of water, snow and slush.

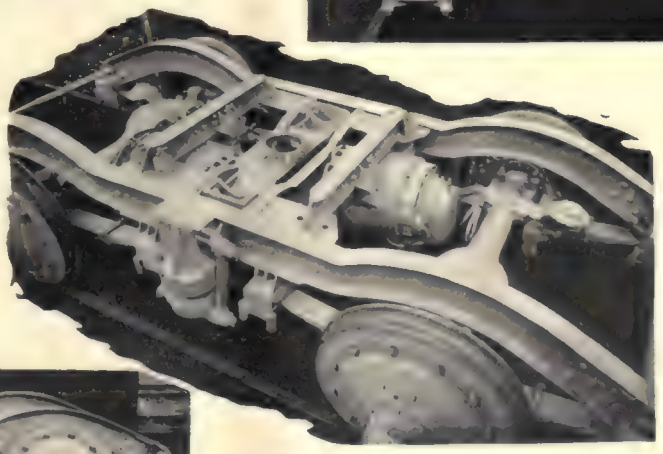
Brakes are of the internal expanding type similar to those developed for buses. They were designed by the Westinghouse Traction Brake Company. Composition inserts used as shoes were made specially by the American Brake Shoe Foundry Company. An accompanying illustration shows the brake mechanism.

This truck weighs only 5,650 lb. complete with motors and drive shaft. Scale weights of various parts are given in an accompanying table. The combination of the light weight and friction reducing features make it possible for a man easily to push the complete truck with one hand along the track.

### Car Body Has Rakish Look

Many novel features have been incorporated in the car body, which has been built by the Wason Manufacturing Company. Underframing is of steel with duralumin bolsters. The weight of each bolster is 101½ lb. It is interesting to note that this is less than the weight of





Unsprung weight is reduced by mounting high-speed motors on the truck frame and connecting them to the remote worm-drive axles through flexible propeller shafts. Brakes of the internal expanding type are located inside each wheel.

Worm-drive roller-bearing truck developed for experimental car

the trolley base used on the car. By using duralumin a saving of 400 lb. was effected without reducing the safety factor. Window posts are of wood reinforced below the belt rail with duralumin angles. The sheathing below the belt rail consists of plates of sheet aluminum held in place by battens. These plates curve inward slightly at the bottom, giving an appearance similar to that of a bus body, and extend 8 in. below the underframe, forming an apron which conceals the greater part of the equipment and running gear.

Length over corner posts is 30 ft. and 40 ft. 8 in. over all. Width over belt rails is 8 ft. 4 in. Truck centers are 19 ft. 6 in. apart. The platforms are curved between the body corner posts and the end, which is straight for a distance of 4 ft. 8 in. Duralumin is used also for the letterboard and belt rail. Altogether 735 lb. of this metal is employed for the side members, letterboards, bolster, etc. Carlines are of steel and wood, while the roof is of tongued and grooved $\frac{7}{8}$-in. cedar covered with No. 8 canvas.

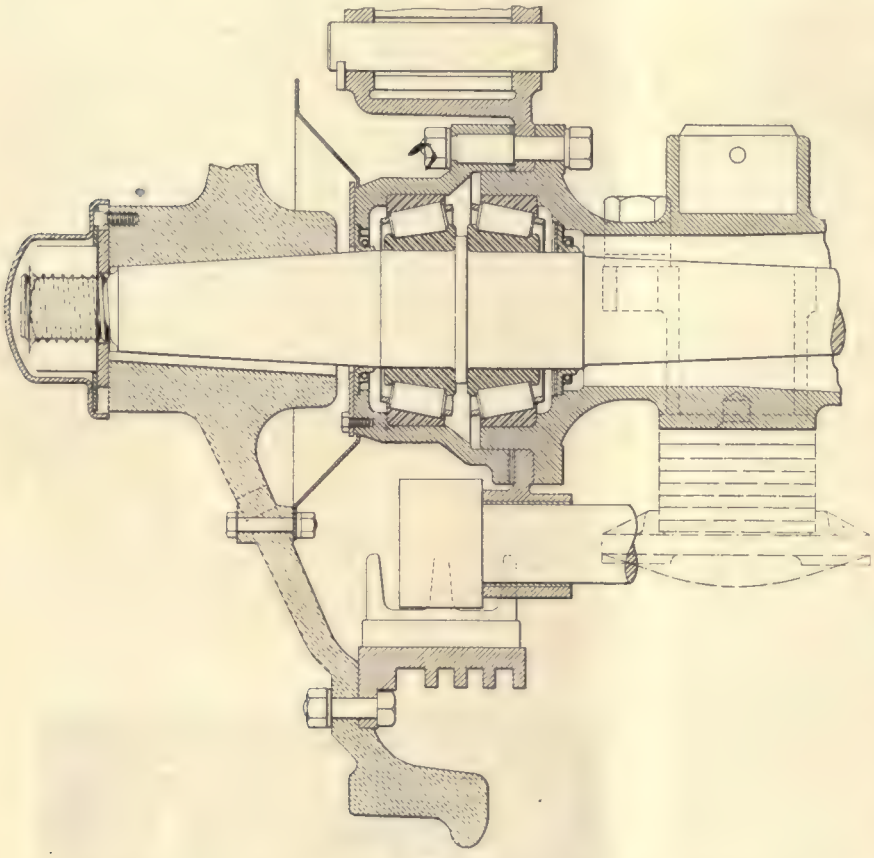
Due to the use of small diameter wheels and the unusual design of the trucks the height from the rail to the car floor is only 2 ft. 8$\frac{3}{4}$ in. There is a single well step between the ground and the car floor, with its edge curved to conform to the body lines. Double outward folding doors conforming to the same curve inclose the four step wells. At two diagonally opposite doors, treadle steps are provided for rear exit. These doors are provided with street collector's control.

A feature which suggests the bus rather than the typical street car is a plate glass sloping windshield 56 in. wide. This has the practical advantage that it eliminates reflections from the interior lights of the car. An electric windshield wiper is provided. Above the windshield is a sloping sun shade. Under this is a hinged ventilator which may be raised to admit air. An automobile type bumper has been placed at a height of 24 in. above the ground.

Special attention has been given to the lines of the roof, which resembles that of a high-grade automobile. The inside height from floor to ceiling is only 7 ft. 2 in. This makes possible the small over-all height of 10 ft. 2 in. from rail to top of roof. All exterior lines are continuous from end to end of the car body. The color scheme is yellow below the belt rail and cream from the window sills to the roof. A red band 8 in. wide completely encircles the car immediately below the window sills. Outside the doors have been painted with bands of color to conform to the general scheme.

Seats are provided for 45 passengers. There are sixteen pairs of cross seats, spaced 31 in. apart, and four longitudinal seats at the ends accommodating three passengers each. Two revolving seats with backs are provided in the center of the platforms. The forward one is for the operator and the other is available for passengers. All seats are deep cushioned and covered with dark brown Spanish leather.

Windows have Rex single drop sash. The floor is a single layer of wood covered with brown inlaid linoleum. Illumination is furnished by five 94-watt dome lamps with a compensating panel, located in the platform cabinet. Ventilators are of the bus type, located in the roof. Chromolux electric heaters are used with thermostatic control. The interior of the car has been given a pleasing appearance by carrying the white Agasote headlinings straight through, unbroken by bulkheads. Below the window sills the sides



The 26-in. rolled steel wheel in dished to bring the throat vertically in line with the tapered roller bearings

### List of Manufacturers of Equipment Used on Springfield Experimental Car

| | |
|---|---|
| Air brakes | Westinghouse Traction Brake Company |
| Air compressor | General Electric Company |
| Axles | Timken-Detroit Axle Company |
| Brake shoes | American Brake Shoe & Foundry Company |
| Car signal system | Electric Service Supplies Company |
| Control | Westinghouse Electric & Manufacturing Company |
| Destination signs | Electric Service Supplies Company |
| Door mechanism | National Pneumatic Company |
| Electric horn | American Bosch Magneto Company |
| Energy-saving device | Economy Electric Devices Company and Wm. Arthur |
| Gears | Timken-Detroit Axle Company |
| Heaters | Railway Utility Company |
| Headlining | Pantasote Company |
| Interior trim | Haskelite Manufacturing Corporation |
| Journal bearings | Timken Roller Bearing Company |
| Lamp fixtures | Electric Service Supplies Company |
| Motors | Westinghouse Electric & Manufacturing Company |
| Sash fixtures | Curtain Supply Company |
| Seats | J. G. Brill Company |
| Seating material | Blanchard Brothers & Lane |
| Shock absorbers | Mack Trucks, Inc. |
| Trolley catchers | Wilson & Company |
| Trolley base | R. D. Nuttall Company |
| Trucks | Wason Manufacturing Company |
| Ventilators | Nichols-Lintern Company |
| Universal joints | Spicer Manufacturing Corporation |
| Wheels | Standard Steel Works Company |

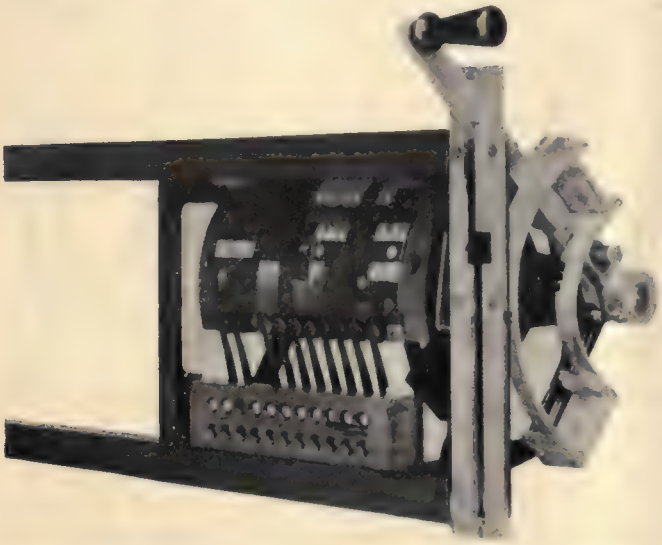
Differential axle and housing before assembly

are of mahogany-faced Haskelite, while brown imitation leather is used above. There are no bell cords or register rods. Faraday buzzers are provided. A two-toned electric horn is used in place of a warning gong.

### Electrical Equipment Is Unusual

Care has been exercised in locating the equipment and the old method of placing switches, thermostats, relays, etc., here and there throughout the car has been abandoned. In front of the operator is a cowl with two panels somewhat resembling a small desk. Switches, light relays, indicating lamps, pressure gage, controller, brake handle, etc., are all mounted flush in these panels. The operator has full control of the car and all apparatus while in his seat.

Remote control of motors is employed. On the platform a master controller operated at 24 volts actuates the main switches under the car body. This master controller is an adaptation of a type of electric vehicle control. The drum is mounted on a horizontal axis, as shown in an accompanying illustration, so that the handle moves in a vertical plane. Energy for the master controller is obtained from two U.S.L. 12-volt storage



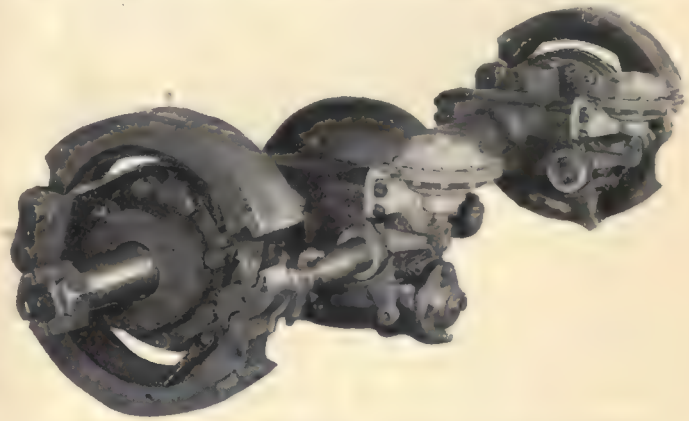
Master 24-volt controller with horizontal drum and handle which moves in a vertical plane is located in platform cabinet

batteries, series connected. These batteries are charged by being in series with the car lamps and the air compressor. Energy is furnished from the same source for the tail lights, so that oil lamps are not required. It is estimated that the saving in this item alone will practically pay for the use of the battery.

### Remote Electric Control Is Used for Brakes and Door Engines

Air brakes and doors have remote control. The operator's brake handle merely establishes various electrical contacts which actuate magnet valves which are located under the longitudinal seats and above the doors. Thus the only pipe on the platform is that for the gage. The pneumatic door engines are of the light-weight type made by the National Pneumatic Company. With this type of door engine and the bus-type braking mechanism it is possible to use a General Electric CP-25-C8 air compressor of 10 cu ft. capacity. In the compressor aluminum castings have replaced iron to lessen the weight. Flexible aluminum tubing with brass automobile type fittings is used for all the air piping.

The emergency brake mechanism is operated by a hand lever of the type used on automobiles. The lever



Movement of the camshaft causes brakeshoes of composition bronze to press against the drum within the wheel

at each end operates only on the adjacent truck. Connection between the lever and the cam by which the brake shoes are brought into play is through wire cables. This arrangement eliminates all chains and rods which might be a source of noise.

Due to the light weight of the motors and the extensive use of duralumin throughout the body, the total weight has been kept down to 23,450 lb. It is expected that this will permit rapid acceleration and braking. The weight is divided between the various parts of the car body and trucks as shown in the accompanying table.

### New Features, if Successful, Will Be Incorporated in Future Cars

Work has been finished on the trucks and only a few minor details remain to be completed on the car body. It is planned to assemble the body and trucks at an early date and test the operation of the car. The management is hopeful that many of the innovations embodied in this design will turn out to be real improvements, but considers the car at this stage to be entirely an experiment. After thorough testing, if the new features prove to be as advantageous as expected, they will be adopted and

DETAIL WEIGHTS OF SPRINGFIELD WORM-DRIVE CAR

| | Pounds | Pounds |
|---|---|---|
| Body | 7,800 | |
| Seats | 1,750 | |
| Floor covering | 200 | |
| Heaters | 300 | |
| Electrical equipment | 600 | |
| Air brake equipment | 1,000 | |
| Miscellaneous | 500 | |
| Total body | | 12,150 |
| Two motors, 424 lb. each | 848 | |
| Two axle assemblies, 1,550 lb. each | 3,100 | |
| Frame | 1,622 | |
| Shafts and joints | 80 | |
| Total, each truck | 5,650 | |
| Total, two trucks | | 11,300 |
| Weight, complete | | 23,450 |

incorporated in the design of future cars. It is anticipated that under conditions of quantity production cars of this type could be built at approximately the same cost as that of the light-weight, double-truck car of the ordinary type.

It is planned to make complete tests of the car, using special apparatus where possible to determine the comparison of the new type with existing equipment. The instrument developed by the committee on noise reduction of the American Electric Railway Engineering Association will be employed to measure the noise. Following these special tests it is planned to place the car in service on one of the lines of the Springfield property and make service tests for a period of from six months to a year in order to determine whether any of the features require modification before the design is acceptable for use.

Switch group located under car body

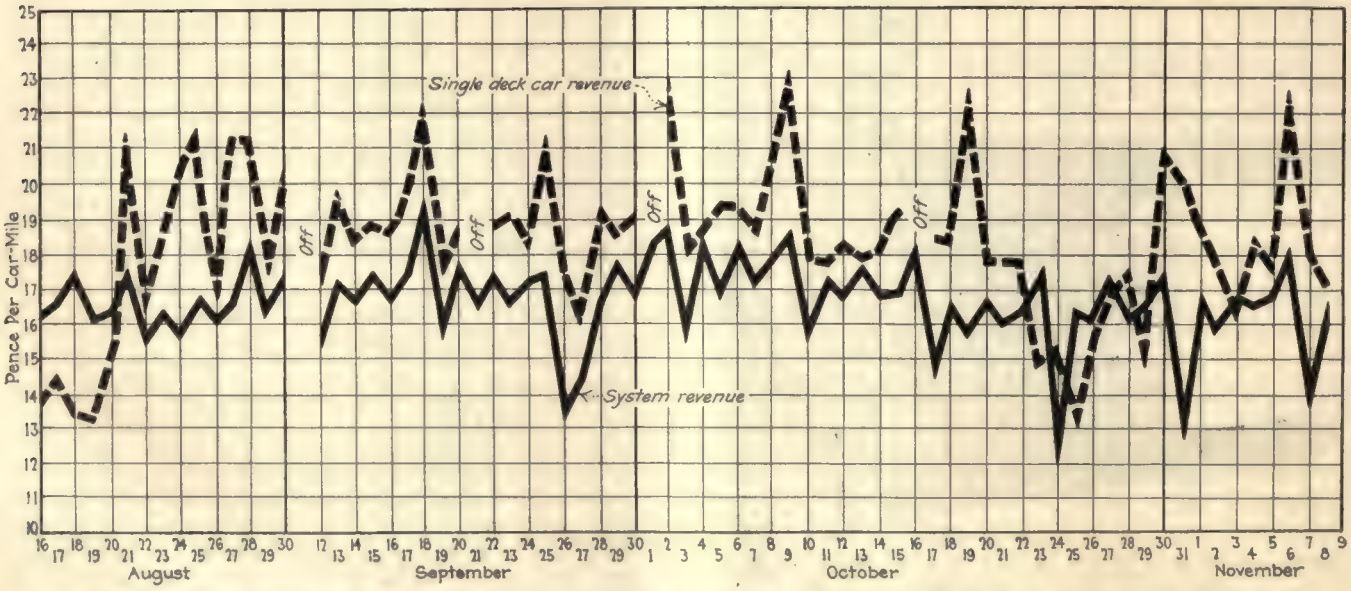
## Total Dividend of St. Louis Loan Association $843,708

AT A recent meeting of the board of directors of the United Railways Savings and Loan Association, St. Louis, Mo., the 23d consecutive semi-annual dividend was declared at the rate of 6 per cent per annum, payable to members of record Aug. 31. The dividend will total $99,000. It brings the grand total paid to members of the association to $843,708. The association has never paid less than 6 per cent dividends, compounded semi-annually, and has paid a dividend every six months. The association has placed 2,009 members in homes of their own. It now has 5,798 members. It was founded to encourage home owning and stimulate thrift.

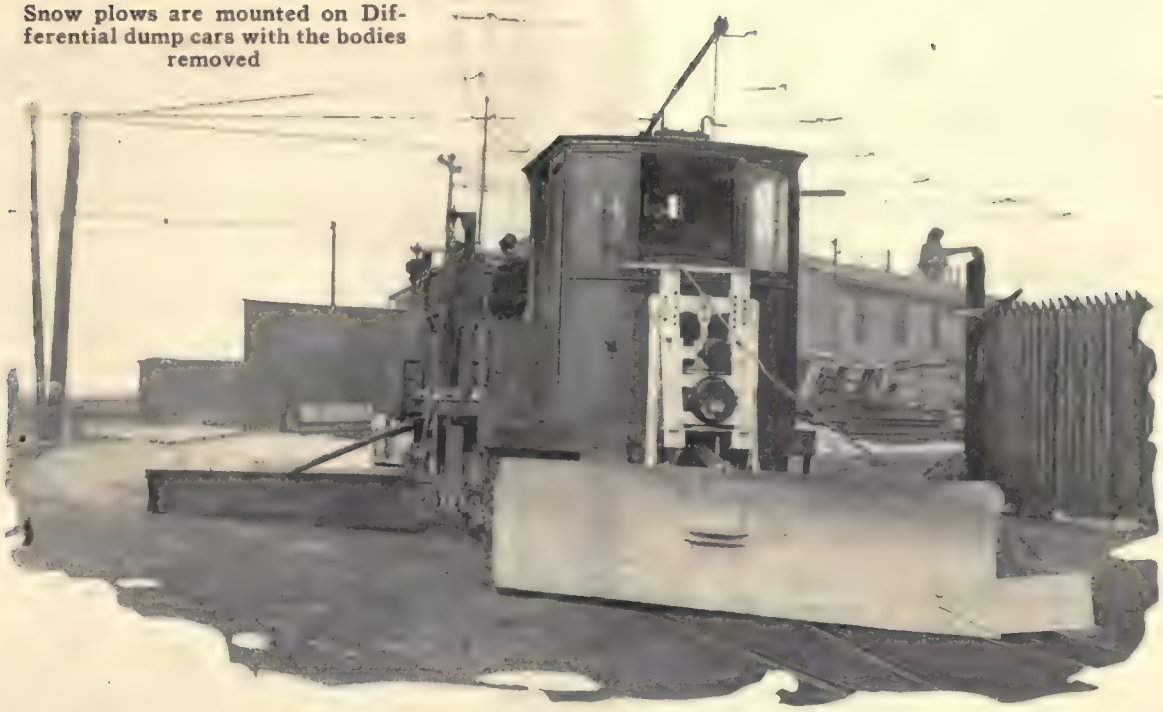
## Glasgow Single-Deck Car Popular but Not Economical

EXPERIENCE of several months with an experimental single-deck car designed by the Glasgow Corporation Tramways, Glasgow, Scotland, somewhat along American lines, has led the management to the conclusion that such a vehicle is not well suited to the transportation needs of that city. While this car has proved quite popular with the riding public, its comparatively small seating capacity has been a disadvantage, especially during rush hours. Details concerning the construction of this car appeared in ELECTRIC RAILWAY JOURNAL, Oct. 23, 1926, page 769.

A measure of the relative popularity of the single-deck vehicle and the double-deck tram long standard on the Glasgow system is had by comparing the revenue per mile of the new equipment and that of the entire system. Earnings have been consistently higher for the single-deck car, as shown by the accompanying chart. During 70 days of operation in August, September, October and November of last year, the revenue per car-mile averaged 18.2 pence for the single-deck car and 16.7 pence for the system as a whole. It is believed that these higher earnings may be due to the more attractive appearance of the new car, and to the use of transverse upholstered seats instead of longitudinal seats of wood. These features, of course, could be embodied equally well in a double-deck car.




Revenue per car-mile with single-deck equipment compared to revenue for the entire Glasgow system shows the popularity of the new car



Snow plows are mounted on Differential dump cars with the bodies removed

# Snow-Fighting Methods Revolutionized

*By H. M. Steward*
Superintendent of Maintenance Boston Elevated Railway

**Boston Elevated Railway Now Plows Snow from Tracks and Roadway, Finding It Pays Well to Keep a Vehicle Road Open to Prevent Blocking Car Tracks**

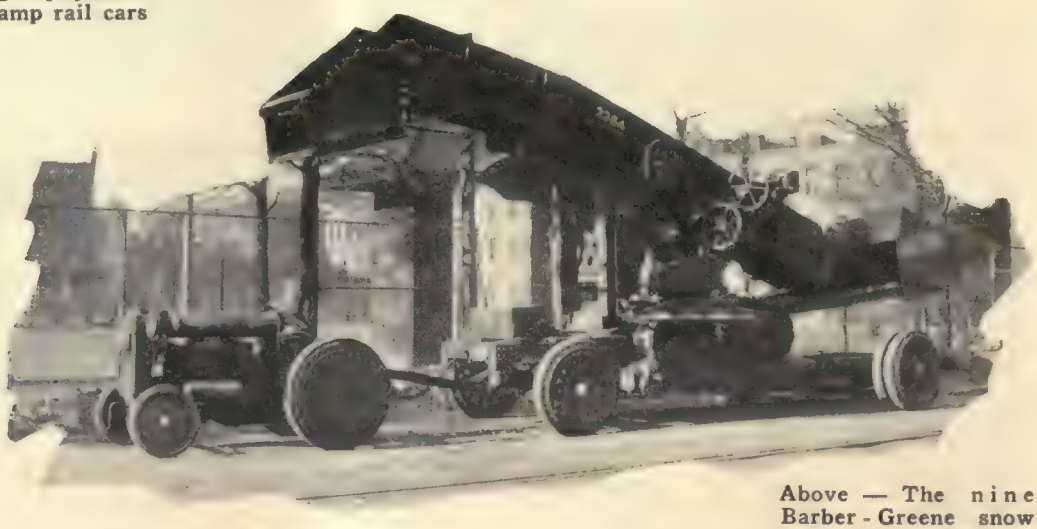
DUE to the changes in traffic conditions which have occurred in recent years; that is, the substitution of motor vehicles for practically all horse-drawn vehicles and the use of motor vehicles, particularly pleasure cars, throughout the year, the Boston Elevated Railway has found it necessary to readjust its method of handling snow.

Formerly the railway plowed the snow from its tracks to provide a clear roadway for the operation of its cars, without being obliged to consider the roadway alongside. In fact, several of the municipalities desired that a certain amount of snow be left on the roadways in order that vehicles on runners could be operated without trouble. During this period, on streets where business would not permit the snow plowed from the tracks to remain, it was necessary for the railway to remove it.

The present method is to plow the tracks with the various types of electric car plows or sweepers, as before. As soon, however, as the snow at the end of the plow or sweeper wings reaches a depth of approximately 12 in. motor vehicles equipped with plows or shears are used to push the snow back further. This operation continues throughout the duration of the storm. On the first night following a snowstorm nine cars equipped with long steel wings come into play for the purpose of pushing the snow back to the curb. If certain streets are too wide for the wings of these cars to reach to approximately the curb, the snow is pushed back to the desired point by motor vehicles working in conjunction with the winged cars. This method of handling the snow provides a roadway for practically the full width of the street, which allows all vehicular traffic to use the entire roadway and does not make it necessary for vehicles to run in the track area only.

This method of handling the snow also removes almost entirely the menace of high ice which formerly existed, and consequently reduces the expense of car maintenance, prevents delays and materially reduces accidents due to vehicles slipping on the ice and side-wiping cars. During the heavy snowfall in the winter of 1919-20, when the tracks only were cleared, ice several inches in depth formed in the track and deep ruts occurred, due to the operation of motor and other vehicles. This resulted in severe losses to the railway on account of delays, repairs to cars, the expense of removing the ice and payment for accidents. By clearing the roadway for practically the full width of the street, the melted snow has an opportunity to run to the sides of the roads and thence to the gutters, instead of accumulating in the track, as it did formerly. It must be understood, of course, that it is necessary to use care and to remove the snow thoroughly from around hydrants and to open catch basins in the gutters. Snow must also be removed promptly from driveways to garages, business houses, gasoline stations, public buildings, etc. The extra expense, if any, of pushing back

The company has an auto trailer that is useful in transporting equipment, and a fleet of four low ramp rail cars



Above — The nine Barber-Greene snow loaders are transported from place to place by several methods. The one shown is on an auto trailer being hauled by a Fordson tractor

Below—Differential dump cars are used for pulling the ramp cars. A snow loader is shown in process of being moved

A close-up view of the ramp cars, showing their construction

the snow for practically the full width of the street is probably more than offset by the saving resulting in lessened damage to cars, delays to traffic and accidents. During snowstorms, when all our plows and sweepers are in use, we have employed up to 22 trucks equipped with plows or shears, together with seven tractors, three Walter snow fighters and one FWD truck.

During snowstorms vehicles are liable to break down on the track area and prevent the operation of cars. To supplement the emergency equipment, which is sufficient during the summer months, it has been found advisable to use trucks equipped with jacks, block and tackle, towing ropes, picks, shovels, etc., stationed at strategic points with two experienced men, besides the driver, as a crew. These trucks are used only while the snow is falling or until the streets are opened for traffic. During snowstorms we have used up to eleven extra emergency trucks of this sort.

On bus routes it is also necessary to plow the snow and during snowstorms up to 29 trucks equipped with shears have been used. After the storm is over the bus routes are plowed to practically the full width of the street and down to the pavement where possible. This is accomplished by using Walter snow fighters which are equipped with scrapers located between the front and rear wheels. If the snow is not plowed down practically to the pavement, the roadways soon become rough and bumpy, with resulting severe damage to the buses.

The railway, in the development of its snow-fighting system, has accumulated a wide range of equipment, most of which has been found quite essential under present-day conditions. It includes the following:

- 9 Barber-Greene snow loaders.
- 4 trail cars.
- 1 motor trailer.
- 7 tractors.
- 3 Walter snow fighters.
- 1 Four-Wheel-Drive truck.
- 44 trucks equipped with shears.
- 6 Differential cars equipped with plows and wings.
- 3 rail cars equipped with wings.

Accompanying illustrations show some of this apparatus.

The railway owns seven 5-ton trucks which are used to plow snow and in addition owns 37 shears for trucks which are used on trucks hired from contractors. Arrangements are made with high-class contractors in the late summer to furnish trucks for plowing and for hauling snow. A list of contractors desiring this work is prepared and suitable arrangements are made for calling and responding promptly. Trucks to be used for plowing are required when a heavy snowfall is predicted and soon after snow begins to fall. In order to speed up the work, the trucks are sent to the railway shops at four different locations and the shears are put in place. After the plowing work has been done, the shears are removed, inspected, repaired and stored, all ready for the next storm. No difficulty has been encountered in securing the necessary number of trucks. During the heavy storms in February, 1926, 130 trucks were readily secured for plowing and removing the snow.

Formerly it was the practice to load snow, to be removed by hand, into sleds or other vehicles drawn by horses. These horse-drawn vehicles were then hauled to convenient dumps and the load was removed by hand.

The present method consists of pushing the snow into long piles parallel with the curbs, picking up the snow and loading it into trucks with Barber-Greene snow loaders. The trucks used hold an average of 7 cu.yd. of snow and 60 seconds on the average is required to load a truck. By the proper selection of dumps, the round trip per truck does not exceed 30 minutes on the average. Seven trucks are sufficient to keep a snow loader in continuous operation, except where the dumps are located beyond the average distance.

The Boston Elevated Railway owns and operates nine snow loaders, which are taken to the locations where they are to be used on low trail cars or on motor trailers. A few of the cities and towns also own snow loaders. When all of the Boston Elevated Railway snow loaders are in operation it is necessary at times, depending upon the amount of snow to be handled, to use up to 100 trucks per day.

By means of snow loaders and trucks the snow which the railway is obligated to remove can be taken care of in a storm of, say, 12-in. fall in not over 36 hours.

Top — Substantial outboard plows clear the roadway alongside the railway tracks

At left—This fleet of 5-ton tractors equipped with V plows has proved excellent for snow fighting in Boston

Above — Two of the three Walter snow fighters which have been used with good results on the Boston Elevated Railway

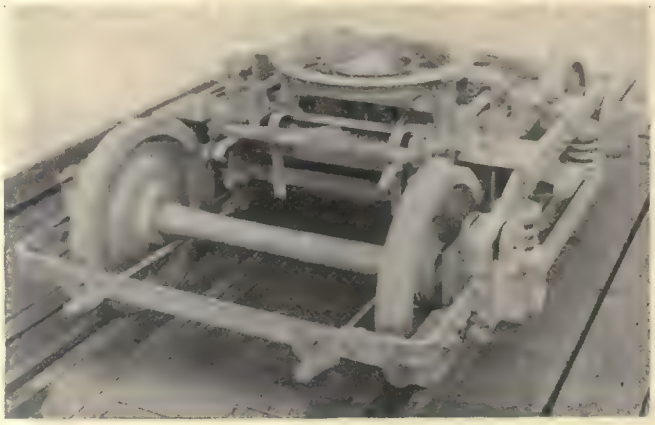
In oval—Three of a group of 44 trucks equipped with Champion snow plows

One of the first service trips of the W., B. & A. articulated trains

Looking through the drum from one body to the next

Passengers boarding one of the ten new articulated cars of the Washington, Baltimore & Annapolis line in the company's Washington terminal

One of the two end trucks before mounting the motors



Center pivot truck without motors but supporting two inner body ends and connecting drum

# Articulated Cars in High-Speed Interurban Service

**Two-Body, Three-Truck Units Built by Brill and Westinghouse-Equipped Go in Service on Baltimore-Washington Division of the Washington, Baltimore & Annapolis Electric Railroad**

Two articulated cars of the W., B. & A., having a four-car capacity, may be operated as a unit

COMPLETE replacement of the high-speed equipment on the 40-mile Baltimore-Washington division of the Washington, Baltimore & Annapolis Electric Railroad is being made as an open challenge to all forms of competitive transportation. The new cars are of the articulated type and the first of this design to be operated in the United States in high-speed interurban service. In addition they are of a de luxe type with better appointments than those of many steam railroads.

Commencing April 1, eight of the new units, built in the Philadelphia plant of the J. G. Brill Company, will be used to fill the half-hour limited schedule between Baltimore and the national capital. Six of the twin cars were delivered early in March and are being "worked in" while the crews become familiar with the details of the equipment. The remaining four have just been delivered and will be ready for regular operation on schedule time. The cars will receive wide publicity as they will help to handle the crowds attending the Bowie race meet starting April 1.

The Washington, Baltimore & Annapolis has lines over two different routes between Baltimore and Annapolis and the main line between Baltimore and Washington. The latter consists of double-tracked private right-of-way as far as the Maryland-District of Columbia boundary line, from where entrance to Washington is over the tracks of the Washington Railway & Electric Company. In Baltimore the company runs its tracks into its terminal on Howard Street.

The two Annapolis lines serve the home of the United States Naval Academy and the intervening territory, much of which is suburban to Baltimore. The country along the Severn and Magothy Rivers is fast developing into summer resorts. Annapolis and the intermediate territory to Baltimore are served solely by the W., B. & A. both for passengers and freight.

The main line between the two major cities is the backbone of the service and revenue of the company. The intervening territory is sparsely settled and hence the need is naturally for high-speed, infrequent-stop service. The Baltimore & Ohio Railroad and the Pennsyl-

vania Railroad are competitors, running many trains from terminal to terminal in 60 minutes or less. With its entrances to the terminal cities on public streets, the W., B. & A. trains require 1 hour and 30 minutes, but have the advantage of more central stations, and charge lower fares.

In recent years de luxe interstate buses between the cities have offered additional competition, and the country-wide automobile expansion has affected this company the same as it has all railways. Despite all this, the W., B. & A. has for a number of years carried annually 60 per cent of all Baltimore-Washington common carrier traffic. Following the enormous peak occasioned by Camp Meade and other World War activities in this territory, the gross traffic has been decreasing consistently, although the 60 per cent ratio has been substantially maintained.

### Combating Competition a Purpose of the New Cars

The new equipment has therefore been purchased not only to give the essential service but to combat the most serious of the competition. It is expected that additional traffic will be drawn from other channels, particularly private automobiles, as the single intercity highway is greatly congested and the parking situations in the two terminal cities are growing worse daily.

Patronage on the Washington-Baltimore division has always been great enough to require two-car trains, which heretofore have been made up with multiple-unit equipment. The old cars were built of wood in the conventional manner of 1910, weigh 40 tons apiece, or 80 tons per train, and have been in use since the change to 1,200-volt d.c. operation in 1910.

The new cars will provide equal passenger capacity with greatly superior facilities and marked economy. The weight saving of 27 per cent alone will reduce the power bill. Three trucks against four, one set of motors, control and equipment as against two, will immediately be manifest in the cost of equipment maintenance. Maintenance of the track should also be less, due to the lighter weight of the units. By means of the permanent connection, the unit is essentially one car, allowing the use of two trainmen as against three.

Loading and unloading at intermediate points is supervised by the conductor at the side door. All doors are pneumatically operated. At terminals the rear door, controlled from the conductor's position, is also used. Upon entering, the passengers choose either car, the rear body always being reserved for smokers.

Besides the innovation of the articulated feature the cars are equipped and finished with a view to comfort and pleasing appearance. Early trials indicate that these aims have been attained. The rigid connection of the two inner ends on the common truck damps out the nosing or side sway common in either single-car or ordinary multiple-unit operation. The tendency to surge between cars when starting or stopping is also eliminated by the use of a single unit with connection through the center track.

The drum mounted rigidly on the center truck provides easy access between the two sections, giving the effect of one long car unbroken by partitions or doors. Even when negotiating the limiting 50-ft. radius curve in Baltimore the width of opening remains the same, although shifted slightly to the side. The connecting drum is cylindrical, allowing each body to revolve about the outer surface. It is made of sheet steel ⅛ in. thick, supported on steel angles. The bottom is rigidly secured to the center of the pivot truck. Rubber rollers attached to each side of each body are held against the exterior of the drum by springs that allow the entire surface of each roller to engage the drum at all times. In this way practically a tight fit is obtained. A rainstorm was encountered during an early trip and no leakage at these points took place.

The interior finish is pleasing. The floors are mottled gray and black rubber that presents a clean appearance even when soiled after a day in service. The double seats are of the individual chair type with heavy springs in the base and individual pads of light springs, heavily upholstered. The backs are firmly attached to the seats and have a well-shaped curve. The backs are constructed with springs and heavily upholstered. Each seat is completely covered with a striped frieze mohair, light gray in color. While operating loops are provided at each terminal, the cars often must be reversed. For

W., B. & A. articulated car easily negotiates the limiting curve of 50-ft. radius. View at the left shows the outer side of the car on the limiting curve, while at the right is illustrated the inner side. The center view shows appearance of the connecting drum opening shifted to one side, but still easily passable

this reason the pairs of seats may be turned horizontally on a center pivot, after releasing a pedal-controlled catch. This feature also permits the seats to be swung partly around should passengers desire to face the side. The twin unit car carries 47 double seats all alike, thus seating 94 passengers. The seats conform to the window spacing of 35 in., leaving ample knee and leg room.

Baggage racks of bronze are mounted overhead with ample clearance. One lavatory with a flush hopper and wash basin is provided at the end of one of the bodies, immediately behind the motorman's compartment. Paper towels and a tank for drinking water are included in the equipment.

Posts, sills, panels and doors are solid mahogany. The ceiling is finished a deep cream, which, with the mahogany trim, makes a pleasing contrast with the neutral gray of the seats and floor.

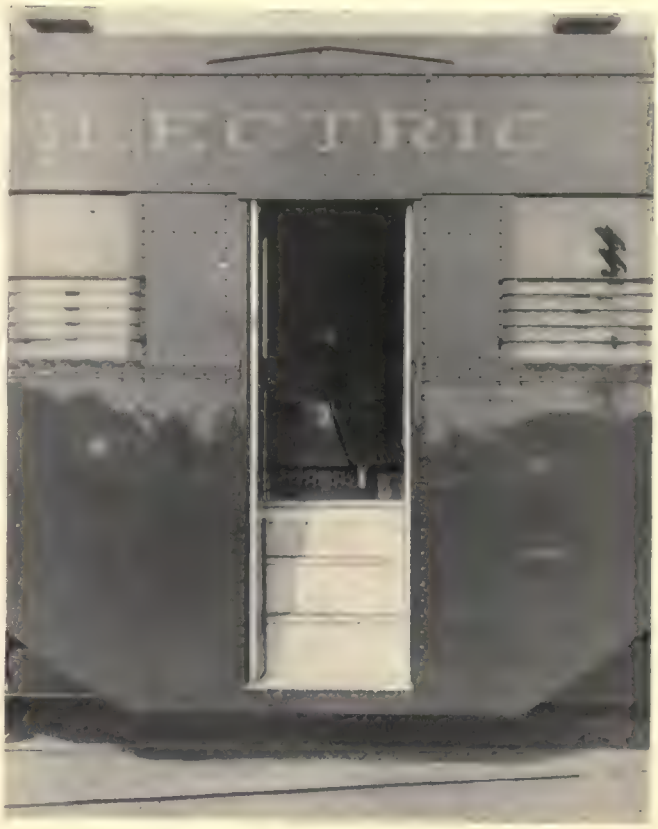
Plate glass set in brass sash is used in all windows. The single side sash may be raised upward into pockets behind the deep letterboard. Illumination is provided by shaded lamps mounted in two rows in the ceiling, one row directly over each seat.

There is a cab for the motorman at the right-hand side of each operating end. A hinged door, glazed in the upper portion, opens into the car. A 22-in. hinged door at the motorman's right, with a glazed drop sash above, gives access to the cab without need for the motorman to pass through the interior. The inclosed compartment contains all operating switches, the controller and the air brake valve. The narrow end doors and left-hand sash are also glazed with plate glass, allowing good visibility forward.

### Multiple-Unit Operation Possible

For extraordinary conditions two units may be coupled together, operated as a train from one position, giving a capacity equal to four of the old cars. To accomplish this there are Tomlinson M.C.B. type couplers at each end and jumper cable connections are placed on the roof. Small end doors allow access between units for the crew. Headlights of the standard portable type used by the W., B. & A. are hung on the forward door, the connectors fastening into sockets in the ends of the illuminated sign boxes shown in the end views. There are two bullseye marker lamps in the letter panel at each operating end. Adams & Westlake No. 252 tail lamps are furnished by the railway.

Specifications tabulated elsewhere show the details of the equipment. In the Jan. 22 issue of ELECTRIC RAILWAY JOURNAL, page 165, were side elevation and floor plan drawings showing the dimensions. The cars are framed with steel, using side sills of 4-in.x4-in.x$\frac{5}{16}$-in. angles. Center sills are 8-in., 11.4-lb. channels with 3-in., 4.1-lb. crossing channels and 6-in., 10.5-lb. bumper channels. The corner posts are 2-in.x2-in.x$\frac{1}{4}$-in. angles with $\frac{3}{32}$-in. steel sheet, while the side posts are 2-in.x 2-in.x$\frac{1}{4}$-in. to $\frac{5}{16}$-in. tees. The top rail is made of 2-in. x2-in.x$\frac{5}{16}$-in. angles and the belt rails of 3$\frac{1}{2}$-in.x$\frac{1}{4}$-in. flat bar with 16-lb. sheet-steel coping. The letter panel and side sheathing are $\frac{3}{32}$-in. patent leveled blue annealed sheet steel. Roof carlines are 1$\frac{1}{2}$-in.x$\frac{3}{8}$-in. steel bars covered with $\frac{5}{16}$-in.x2$\frac{1}{2}$-in. poplar boards.




**Between terminals passengers enter and leave by this center door, where the conductor is located. All doors are under pneumatic control from this position**

Scale weights were slightly less than the estimated weights as published in the previous article. The units averaged 58$\frac{1}{2}$ tons, divided between equipment and distributed on trucks as shown in the accompanying two tables.

## General Dimensions and Specifications, W., B. & A. Articulated Cars

| | |
|---|---|
| Length over all, each section | 48 ft. 8 in. |
| Length over vestibules, two-section unit | 95 ft. 4 in. |
| Length over all, two-section unit | 97 ft. 4 in. |
| Wheelbase, motor and pivot trucks | 6 ft. 6 in. |
| Width over posts | 8 ft. 8 in. |
| Width over drip rail | 8 ft. 10 in. |
| Width of each side door opening | 2 ft. 10 in. |
| Height, rail to top of floor | 4 ft. 2$\frac{1}{2}$ in. |
| Height, rail to center line of coupler | 33$\frac{1}{2}$ in. |
| Height, top of floor to top of roof board | 8 ft. 5$\frac{1}{2}$ in. |
| Height, rail to top of roof | 12 ft. 8 in. |
| Height, rail to top of trolley board | 12 ft. 11$\frac{1}{2}$ in. |
| Truck centers, each section | 35 ft. 10 in. |
| Distance center to center of side posts | 2 ft. 11 in. |
| Wheel diameter | 36 in. |
| Seating capacity, section without saloon | 48 |
| Seating capacity, section with saloon | 46 |
| Total seats | 94 |
| Interior trim | Mahogany |
| Headlining and side lining | $\frac{1}{4}$-in. Agasote |
| Air brakes | Westinghouse Traction Brake Company |
| Car signal system | Consolidated Car Heating Company |
| Car trimmings | Statuary bronze |
| Compressors | Two Westinghouse D-2-K, 1,200-volt |
| Control | Westinghouse HL, double-end, 1,200-volt |
| Couplers | O-B Company Tomlinson No. 23 radial |
| Curtain fixtures | Curtain Supply Company Rex |
| Curtain material | Pantasote |
| Destination signs | Illuminated, in dash |
| Door mechanism | National Pneumatic Company, not interlocked with control |
| Fenders | Steel pilots |
| Gongs | Brill dedenda |
| Grab handles | Elleon type, mahogany, porcelain finish |
| Hand brakes | Peacock tunnel type |
| Heaters | Railway Utility Company, truss plank No. 130 |
| Journal bearings | 4$\frac{1}{4}$ in. x 8 in. |
| Journal boxes | Brill |
| Motors | Four Westinghouse 333-VV-8, inside hung on end trucks only |
| Sanders | Ohio Brass Company |
| Sash | Rex all-metal type |
| Seats | Hale & Kilburn No. 900 double rotating chairs |
| Seating material | Chase frieze plush, pattern No. 188, gray No. 2,082, quality X |
| Step treads | Kass safety |
| Trolley retrievers | Ohio Brass Company |
| Trucks | Brill 26-MCB-2 |
| Ventilators | Railway Utility Company |
| Wheels | 36-in. diameter, 3$\frac{1}{2}$-in. tread |
| Window glass | $\frac{3}{16}$-in. plate |

AVERAGE WEIGHTS OF W., B. & A. ARTICULATED CARS

| | |
|---|---|
| Bodies, including electrical and air equipment | 70,993 lb. |
| Four motors | 14,570 lb. |
| Three trucks | 31,090 lb. |
| Total weight of complete unit | 116,653 lb. |
| Scale weight on trucks of one unit: | |
| Front truck carried | 41,180 lb. |
| Center truck carried | 32,440 lb. |
| Rear truck, with saloon carried | 42,710 lb. |
| Total weight of complete unit | 116,330 lb. |

With one set of four motors, two mounted on each end truck, only one set of control and air brake equipment is necessary. Air brakes are placed on the center truck as well as on each motor truck, giving brake applications on all wheels. Because of the difference in weight distribution, adjustments to apply equivalent pressures on all wheels are made. The straight and automatic type of brakes with emergency features are used with two compressors, one mounted under each body. This is a precautionary measure in case of failure of one compressor.

From the Baltimore terminal to the District of Columbia the operation is with 1,200-volt direct current obtained from an overhead catenary trolley. From this point to Fifteenth and H Streets, N. E., in Washington, a 600-volt direct-suspension trolley is used, and from there to the W., B. & A. terminal 600-volt energy is taken from the underground conduit system. The Westinghouse motors are wound for 600-volt operation, but insulated for 1,200 volts, being connected permanently in series, so that speed is reduced on 600 volts. The free running speed on 1,200 volts is 60 m.p.h., so that half speed is ample in the District and Washington. Control current at 600 volts is obtained through a 600/1,200-volt dynamometer when operating from the high voltage trolley.

The doors are of mahogany, 1½ in. thick, double-folding inwardly. They are weather stripped, and the upper portion is glazed with $\frac{3}{16}$-in. plate glass. They are equipped with National Pneumatic Company engines and may be controlled from the conductor's position or at the doors themselves. They are not interlocked with the control. There are three steps, which are all inside the doors and are stationary, with O. M. Edwards hinged trap doors to close over them. All steps have Kass safety treads. The height from the rail to the underside of the first step, that at the sill, is 11 in. The step heights are 16 in., 11½ in., 12½ in. and 12½ in.

# The Readers' Forum

## *President Sawyer Commends Graham Articles*

EAST ST. LOUIS & SUBURBAN RAILWAY

EAST ST. LOUIS, ILL., March 10, 1927.

To the Editor:

I, too, want to be recorded as one of those who believe that the two articles in the ELECTRIC RAILWAY JOURNAL by R. N. Graham, general manager of railways Pennsylvania-Ohio Electric Railway, represent an outstanding contribution to the discussion of one of the most important subjects before the local transportation industry, viz., "The Place of the Motor Vehicle."

We all agree that the motor vehicle has a place as a new and important transportation tool. Due partly to our own fault and partly to the fault of the motor vehicle manufacturers, few of us have as yet been able to arrive at definite conclusions as to the proper sphere or field of this most important tool.

We are doing neither ourselves nor the motor vehicle industry proper credit when we simply operate buses just to protect ourselves against irresponsible pirates, or because of the so-called "rubber urge," which has been largely an urge on the part of the bus manufacturers to sell rubber-tired buses.

The advantages and disadvantages of the bus have both been discussed in too broad terms, due to the fact that we have lacked definite experience and information. It has been used in places where it should not have been used and has not been used in places where it should have been used. Eventually the bus will take its place, regardless of past prejudices, either for or against. Electric cars will not continue to prevail sim-

W., B. & A. train unloading on the station loop at the company's Baltimore terminal

ply because we hide our heads in the sand and condemn the bus. The day will come when the bus will not be sold or oversold due to high-pressure salesmanship and distorted propaganda. The novelty and the glamor of the bus is fast fading, but not its value as a transportation vehicle.

Mr. Graham hit the keynote in his assumption that the problem is an economic one, and he well sums up the situation when he says that electric cars should not be operated where the bus can be used more effectively, nor should the bus be operated where the street car produces more satisfactory results—taking into account both service to the public and the financial results to the company. Our customers have a right to this service, which is most adapted to their needs, and Mr. Graham's articles, being based upon the actual experience of a progressive, unprejudiced manager, are most helpful in determining just how and where the bus can be fitted into our co-ordinated service.

W. H. SAWYER,
President.

## *Clean, Bright Cars Attract Riders*

DES MOINES CITY RAILWAY

DES MOINES, IOWA, March 5, 1927.

To the Editor:

We are firm believers in the regular and systematic painting of cars, both inside and out, first to attract the attention of passengers and entice them to ride with us, and then from the clean, bright-appearing interior make them want to ride again, for it is always the repeat rides that count.

Several years ago we changed our color scheme from a green to a chrome yellow, with red letterboard and sash. We have found it much more satisfactory, both in appearance and from an accident standpoint, on account of greater visibility. It is our aim to keep all cars as nearly uniform as possible, especially the interior arrangement, as the passengers do not cause the congestion that would occur if several different plans were used. This also applies to the car mechanism, such as controller, brake, gong, etc., as the operator then knows just where to find things in an emergency. This is especially true with new men.

The necessity of changing cars on the road on account of car failure should be held to the lowest number possible, so that passengers will not be caused the inconvenience of changing from one car to another. Trolley wheels and poles are given the closest inspection as I do not believe any one thing can be more annoying to passengers than a trolley wheel that makes a noise multiplied many times by the roof and headlining, which act as a sounding board.

One other part of the equipment that is liable to cause passengers much discomfort is the motor resistance used in starting the car. It is very annoying to have the car give a violent lurch every time it starts, and also the jerking may cause damage suits by passengers falling.

In this day of fast schedules and heavy automobile traffic, flat wheels are more numerous than in years gone by, and must be given attention at once as they are not only uncomfortable to ride on, but are annoying to residents near the car line. We are giving the question of seat upholstery some thought, as clean and comfortable car seats will do much to get repeat riders.

C. R. MCMAHON,
Superintendent of Equipment.

## *A.E.R.E.A. Research Department Proposed*

DEPARTMENT OF STREET RAILWAYS

CITY OF DETROIT, March 15, 1927.

To the Editor:

With the trend that events in the electric railway field are taking, succeeding demands for modernization and all the things which follow in its train, we become conscious of one very great defect in our cosmic scheme and that is lack of reliable, unbiased data on many engineering problems. The present method of attacking them is either such research as individual companies can make or investigation by committee of the A.E.R.E.A.

The first plan, or company research, will work satisfactorily for small problems and for that company, but for the industry it is not economic because normally the results are not broadcast, thus necessitating its repetition by other concerns. Nor would the results be acceptable to others because of suspected bias of the investigators and special conditions of tests. The second plan, or that of committee investigation, is much better for the industry at large, but it, too, is far from satisfactory. In the first place, committees are slow in functioning, not through lack of interest but from the inherent nature of the structure. The procedure is too apt to fall into the old stand-by of issuing a questionnaire and basing a report solely upon it. The fault with questionnaires is that in engineering problems individual opinions are given instead of proved statements. Committees are usually formed of men widely scattered throughout the field, which prevents frequent meeting. The members are loaded with the duties incident to their jobs, consequently the gratuitous committee work must be crowded in wherever possible, and this leads to postponement. Heaven knows, procrastination is easy enough without any encouragement! Then, again, committees are mostly without funds, though the recent policy of making appropriations is opening possibilities for adequate investigation heretofore out of reach. This policy means real progress and should be given every encouragement.

However, it is believed that this is not sufficient for the highest and most rapid development. In order to achieve the best, it is thought that the establishment of a research department of the A.E.R.E.A., under the guidance of a competent research engineer with an adequate staff and funds to carry on the work, would meet the challenge to our industry for its place in the field of transportation. It is unfair and certainly undignified that a small group of companies should have to assume the burden of research, and yet this is what they have been obliged to do at times. The very nature of the situation lends itself admirably to co-operative research. The problems to be solved are common throughout the country and there is no competition between companies. This is an ideal situation for correlation of effort.

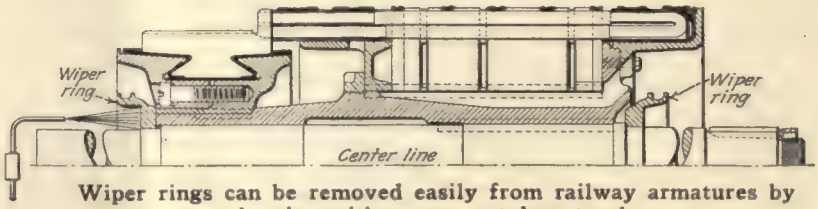
Under such a plan the committees should be continued, but their functions would be more akin to those of a board of directors. They would outline policy, digest findings and act as the balance wheel. The actual work of investigation and study would devolve upon the research engineers, who, being engaged solely in this work, would be able to go deeper into the subject and produce quicker, and it is hoped better, results.

H. S. WILLIAMS,
Assistant Superintendent of Equipment.

# Maintenance Notes

## Some Shop Uses for the Oxyacetylene Torch

By F. J. Foote
Superintendent of Motive Power and Equipment the Indiana, Columbus & Eastern Traction Company, Springfield, Ohio




Wiper rings can be removed easily from railway armatures by heating with an oxyacetylene torch

QUITE extensive use is made of the oxyacetylene torch in the shop of the Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, where it is employed to good advantage for several unusual operations. Wiper rings on railway armatures as a rule are not provided with any arrangement for removal, and they are sometimes stuck very tightly onto the shaft. By directing the flame from a torch against the inner face of the ring, and moving the flame around the ring several times, it is heated without appreciably heating the shaft. The expansion of the ring is sufficient to permit its removal easily with a pair of tongs. These rings are indicated on the accompanying sketch.

Dismantling of car trucks is a tedious and disagreeable job, as many of the nuts are rusted onto the bolts or the thread is somewhat distorted due to excessive strain. The removal of such nuts by the old method often requires the cutting of many bolts and rivets and the splitting of the nuts with chisels. This work can be done very quickly and neatly with a cutting torch, and the ruining of a few bolts that might be reclaimed by the old method is more than compensated for by the time saved.

Various metal parts of the truck require straightening, and a common method is to remove them from the truck for this purpose. By heating such parts with a torch they can be straightened with a wrench or a sledge while in place. Care must be exercised in this heating not to burn the metal. This can be prevented by keeping the torch in motion constantly. The writer has seen an area about 6 in. x 6 in. on a 1-in. steel plate heated to a bright red heat in this manner.

In cases of car wrecks the cutting torch is indispensable. Work that formerly required hours can be done with the torch in minutes. The element of time under wreck conditions is frequently of utmost importance, and the matter of cost is of little consequence compared with the necessity of clearing the wreck in the least possible time.

Another convenient use for the torch is the straightening of armature shafts and similar parts which must run true. To straighten a shaft, the complete armature is mounted on lathe centers and rotated slowly, the torch being held stationary and the flame directed to the point where the shaft is bent. Jacks or bars are used for the straightening, which is done as soon as the section is heated to the necessary temperature. Pressure is applied with the jack or bar and the heat from the torch can frequently be continued even while the pressure is being applied. The great convenience and time-saving feature is that the shaft can be tested repeatedly, marked, heated and straightened without removal from the lathe.

## Tempering and Resetting Springs

By C. A. Kyle
Wolf Street Shops, New York State Railways, Syracuse, N. Y.

SPRING repairs are facilitated and the cost of tempering and resetting springs has been reduced by a spring-tempering furnace of the gas-burning type that recently has been installed in the Wolf Street shops of the New York State Railways, Syracuse, N. Y. The furnace has a cast-iron frame, 6 ft. long by 2 ft. wide by 14 in. high. This is lined with retort brick, capable of withstanding very high temperatures without crumbling. Gas is supplied by a 2-in. pipe which is fitted into

Tempering and resetting of springs at the Wolf Street shops of the New York State Railways, Syracuse

two manifold type burners, one on each side of the furnace. The flames from these burners are directed through port holes in the walls of the furnace.

To get the maximum amount of heat from the gas flame, air is mixed with the gas. The mixture is regulated by an inspirator which uses high-pressure air blown through a small opening in a Y fitting, one end of which is open to the atmosphere. This fitting is connected to the gas pipes ahead of the point where they reach the furnaces. It is regulated to furnish the right amount of air to obtain the pressure desired. A safety feature is a check valve in the gas meter that closes and automatically shuts off the flow of gas in case of a backfire in the pipes leading to the furnace.

Two of the principal troubles found with car and bus springs are flattening out due to loss of temper, and breaking of the leaves. Loss of temper is usually the result of improper tempering when the spring is first assembled. Over-tempering makes the steel too hard and causes breaking of the leaves when the car or bus is overloaded.

The practice in the Wolf Street shops when a spring becomes flat is to remove it and take it apart. Each leaf is reshaped individually to conform with specifications. The leaves are then placed in the tempering furnace, which has been heated to proper temperature, and are allowed to remain until they have obtained the proper color, usually a dark red. They are then removed and dipped in a tank of oil.

The oil for tempering is kept cool by having it in a double-walled tank, the space between the inner and the outer wall being filled with running water. The water enters at the top and is discharged at the bottom, thus keeping a continuous flow of cool water. The tempering cannot be done successfully if the oil gets warmer than 98 deg. F.

After the leaves have been removed from the tempering tank, they are assembled and retaining bands are shrunk on.

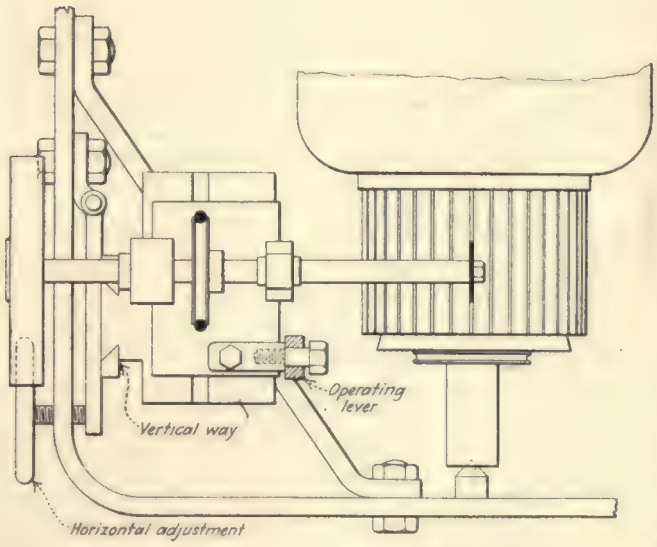
Where the leaves are broken the spring is taken apart and new leaves of the same material and dimensions are made and tempered for installation in place of the broken leaves.

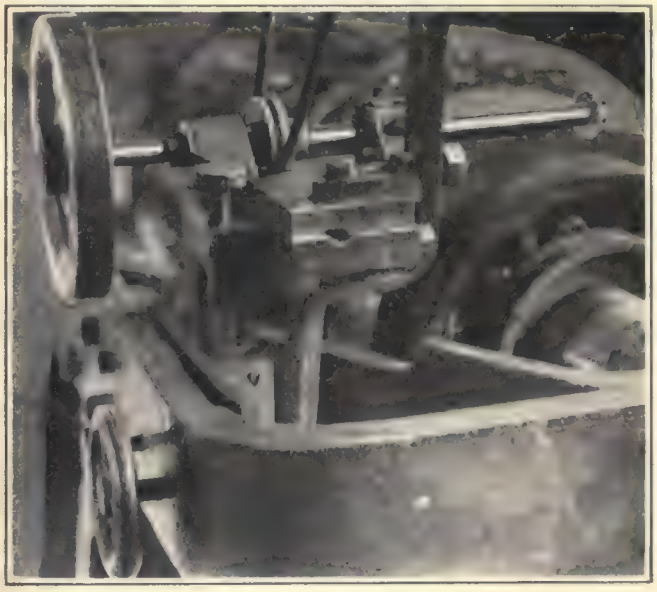
*"Ask Dad, He Knows"*
*the value of systematic and regular inspection.*

# Commutator Slotter with Alignment Adjustment

DESIGN of the commutator slotter built and used in the shops of the Los Angeles Railway combines simplicity with accuracy and ease of operation. In addition to the adjustments for depth of cut and length of stroke, it also permits of alignment of the cut to take care of slight variations in segments.

The spindle carrying the milling cutter on one end and a balance wheel on the other is mounted on the main carriage of the machine. This carriage is moved back and forward by a lever, the spindle being driven throughout the travel of the carriage by a ½-in. round belt, which in turn is driven by an overhead pulley with an idler taking up the slack in the belt. The entire carriage may be raised and lowered by a screw. The depth of cut is controlled by a set screw on the top of the carriage. The main frame with its vertical way is carried in a casting that is hinged at one side and is moved in or out by an adjusting screw. It can be locked in any position by a set screw. With this arrangement the entire apparatus inside the supporting frame may be swung in a horizontal plane to obtain alignment of the cutter with the slot of the commutator.



**This commutator slotter provides for convenient adjustment to suit conditions**

Plan of commutator slotting apparatus that is mounted inside of the main frame which supports the commutator while the mica is being cut away.

Alignment is controlled by screw which swings entire slotting apparatus in a horizontal plane about the hinged end of the supporting casting. The slotter spindle is driven by a round belt from an overhead shaft. A balance wheel is carried on the outward end of the spindle.

## Old Rattan Seats Stained Green

IMPROVEMENT in the appearance of the car interior has been effected by the Atlantic & Suburban Railway, Pleasantville, N. J., by staining old rattan seats green. The problem of restoring these seats was complicated by previous unsuccessful attempts to improve their looks. Sev-

eral years ago, when the rattan had become dirty, the seats were treated with mahogany stain. That color proved to be too dark to be satisfactory. Next the seats were painted, but the paint chipped off. Finally as much as possible of the previous treating material was removed. The seats were then given a coat of green Japan thinned with turpentine. This was immediately wiped off with a rag. Then a coat of Wilson's cane glaze was applied. As a result of this treatment the seats have a clean, fresh, green color, harmonizing well with the other interior fittings of the car.

# New Equipment Available

## Heavy-Duty Chassis

DESIGNED to meet the severe demands of constant starting and stopping and with abundant power and speed, a new heavy-duty chassis for the 21-passenger street car type bus has been announced by the Studebaker Corporation, South Bend, Ind.

The motor has a positive force-feed lubricating system and the chassis is lubricated by a high-pressure system. A specially designed 1½-in. double-jet, two-range carburetor is used. Current is supplied by a 12-volt generator, accessibly mounted at the right forward end of the engine, and by a threaded-rubber-separator storage battery. The distributor is at the left front of the engine and the entire ignition system is protected against moisture.

The starter is operated by a switch on the floor board. A 30-gal. gasoline tank is carried at the rear of the frame and the fuel is fed to the carburetor through a vacuum tank system. A tubular radiator, four-blade 20-in. fan and a circulating pump system cool the motor.

The clutch is of the double-disk, dry-plate type and the transmission, a selective type with four speeds forward and one reverse, is in unit with the clutch and engine. The semi-floating rear axle has extra large chrome molybdenum shafts. The drive gear is of the spiral bevel type.

The use of the Hotchkiss drive principle eliminates torque tubes or radius rods. The torque and drive are taken through the springs and the propeller shaft is a 3-in. diameter steel tube, turning through three universal joints and with the angle of drive a minimum because of the low-hung chassis design. The springs are semi-elliptic, with fourteen leaves in the 36-in. front units and twelve leaves in the 56-in. rear units. Newly designed short shackles reduce side sway.

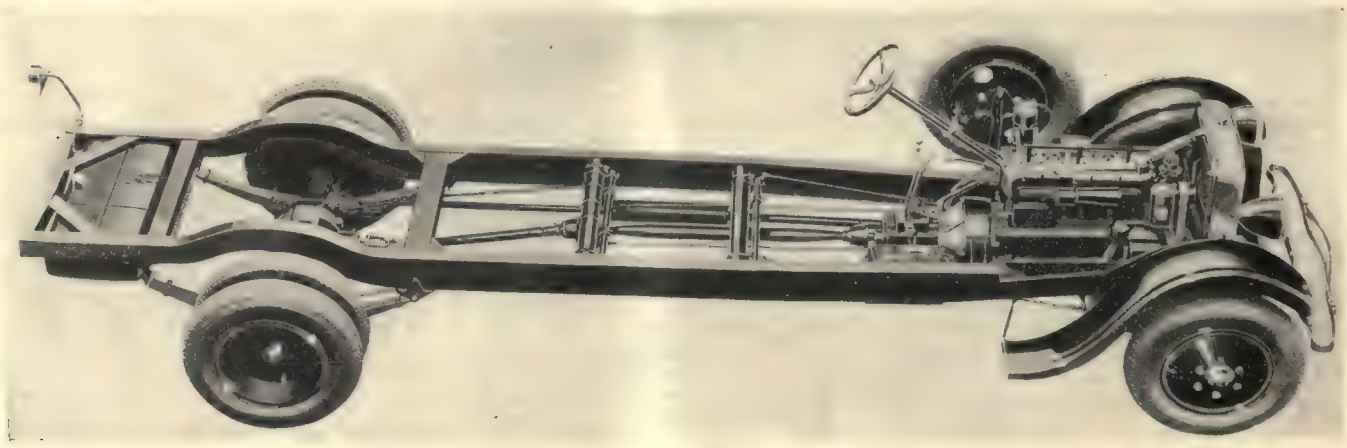
Mechanical internal expanding four-wheel brakes are used. These brakes are 3 in. wide by 17¼ in. diameter and have three expanding shoes which utilize the speed of the vehicle to increase the braking action. Hand emergency brakes operate on the rear wheels. The steering gear is of the cam and lever type, designed for balloon tires. The pressed channel steel frame is narrow at the front to allow a short turning radius, with side members 8 in. deep and 3-in. flanges secured by nine stout cross members, of which two are tubular. The non-skid 34 x 7.50-in. balloon tires and dual rear wheels add safety and comfort. Without changing wheels this chassis may be equipped with 32 x 6-in. high-pressure tires if desired. There is sufficient space between the dual rear wheels to allow chains to be put on or taken off easily.

Two-beam acorn headlights are controlled from a switch on the instrument board. The new chassis is equipped with speedometer, eight-day clock, engine thermometer, ammeter and oil pressure gage grouped under an oval glass on the instrument board, rear traffic signal light, ignition switch on instrument board, automatic windshield cleaner, rear view mirror, front full width bumper, spare tire carrier and four-wheel brakes.

## Improved Welding Electrode

WELDING electrodes of a new type which combine the characteristics of a fluxed electrode and the quality of bead finish and the cleanness in handling of a bare welding electrode have been introduced by the merchandise department of the General Electric Company, Bridgeport, Conn. Recommended for the general welding of steel, the electrode has a uniform flowing quality. The absence of sputtering or spattering, characteristic of the usual commercial bare welding wire, is said to be one of the features of the new material. The elimination of the erratic arc condition leads to a deposit of more material with the same consumption of electrode per kilowatt-hour. The electrode penetrates quickly and produces high tensile strength and unusual ductility and elongation.

The electrode, which has been designated GE type F, is furnished in 3/32, 1/8, 5/32, 3/16 and ¼-in. sizes. The standard package is 50 lb., burlapped. It is also furnished on steel reels of approximately 200 lb., or in coils of approximately 150 or 200 lb.



Many desirable operating features have been incorporated in this chassis

# Association News & Discussions

## Illinois Utility Men Denounce "Home Rule"

WITH the Illinois Legislature in session and committees considering two so-called "home rule" bills, members of the Illinois Gas Association, Illinois State Electric Association and Illinois Electric Railways Association met in Springfield on March 17 and 18 and in no uncertain terms denounced both bills. That the Illinois utilities associations are not in favor of home rule, but are vigorously opposed to it, could be gained after the first few minutes of the opening session of the two-day convention. Throughout the meetings at both the general and the several sessions of the individual associations, papers read and discussion offered pointed out the fallacy and difficulty of municipal regulation of such extensive utilities as exist in the state.

Of as great importance to the electric railway men in attendance were the papers and discussions on subjects which, according to W. H. Sawyer, president of the American Electric Railway Association, mark a new era in transportation. Today, according to Mr. Sawyer, in discussing one of the papers presented at the first session of the railway meeting, railway men are studying traffic control, one-man car operation, bus operation and modernized cars. Railway executives who even five years ago prided themselves on their knowledge of operating problems today have many new lessons to learn. More opportunities present themselves for advancement in the industry than ever before, he said.

### New Car Truck Exhibited

This point of view was forcefully illustrated by a new type of electric railway car truck of the Chicago & Joliet Electric Railway, shown for the first time so that both railway men and manufacturers could see the advancement made in truck construction on the initiative of J. R. Blackhall, vice-president and general manager of the company.

Abandoning the conservatism which usually characterizes a railway executive at conventions, Mr. Blackhall explained why it was necessary for him, as an operating man, to design and have built a piece of railway equipment in order to improve operating efficiency and reduce the weight per seated passenger of the completed car. He enumerated some of the obstacles which he had to overcome in pioneering a truck, not the least of which was the general indifference toward fundamental improvements in rolling stock. With the co-operation of the Timken-Detroit Axle Company, the Westinghouse Electric & Manufacturing Company and the Westinghouse Air Brake Company, together with automotive parts manufacturers, Mr. Blackhall was able to design his truck so as to make a large weight reduction from conventional construction. Reduction of noise by full inclosure of gearing, spring suspension of motors and easy riding qualities were other objectives sought.

### Home Rule Scored

On the subject of home rule, which according to the bills now before the Illinois State Legislature means the regulation of utilities by municipalities rather than by a state regulatory body, S. I. McElhoes, attorney of Oklahoma City, Okla., gave an interesting statement of how the indeterminate or revocable franchise works in his state. That this type of franchise is equitable and just is shown by the relationship between the people of Oklahoma and the telegraph and telephone companies, which in that state have had continuous franchises for 35-year periods. Only in the last two years has the State of Oklahoma had the revocable franchise adapted to other utilities. At a recent referendum vote sponsored by the "anti" forces the people again indorsed the indeterminate franchise, and as a result all utilities are regulated by the corporation commission and not by the individual municipalities which they serve.

In addition to his active participation in the discussions of the railway section papers, W. H. Sawyer delivered a paper at the opening joint session of the convention. In this paper Mr. Sawyer presented an outline of the utility situation in Australia, where last summer he made a detailed study of utilities operations in the Antipodes.

### Three Important Subjects Discussed at First Railway Session

E. J. McIlraith, staff engineer Chicago Surface Lines, opened the first afternoon session of the Electric Railways Association with an interesting technical discussion of traffic regulation for cities of all sizes. In the opinion of Mr. McIlraith, the problem needs practically the same treatment in all communities. As an example of the task which confronted the Chicago Surface Lines in establishing traffic regulations, Mr. McIlraith cited some figures on the pedestrians and vehicles making use of the downtown streets during a business day. More than 66,000 people pass between curb lines at State and Madison Streets in one hour. More than 800,000 vehicles, of which 90,000 are automobiles, come into the Loop district in twelve hours. It was Mr. McIlraith's suggestion that the railway management take up the burden of regulating street traffic.

Other factors in traffic regulation as brought out by Mr. McIlraith's paper, which will appear in a later issue, were discussed, tying them in specifically with conditions in Chicago and on the Chicago Surface Lines. According to Mr. McIlraith the traffic signals should be installed when there is a volume of 16,000 vehicles in the sixteen-hour period and only when traffic conditions warrant such installations for safety and speed.

In discussing Mr. McIlraith's paper, G. W. Welsh, vice-president, East St. Louis & Suburban Railway and president-elect of the Illinois Electric Railways Association, stated that the $50,000-per-mile cost of constructing track includes day work under heavy traffic conditions. In view of the plea of Mr. McIlraith for more extensive night work, Mr. Welsh was of the opinion that a considerable part of the cost of track construction could be saved by night work.

Specific details relative to motor bus maintenance on the East St. Louis & Suburban Railway were given in a paper read by H. P. MacDonald, superintendent of automotive equipment of that property. Mr. MacDonald's paper, in which the importance of good housekeeping was stressed, was published in the March 19 issue.

Discussing Mr. MacDonald's paper, Fred Klock, in charge of the maintenance of motor coach equipment for the Chicago, North Shore & Milwaukee Railroad, stated that garage design and operation necessarily must be modified to meet individual requirements. He

### COMING MEETINGS OF *Electric Railway and Allied Associations*

*April 1*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

*April 26-29*—Southwestern Public Service Association, convention, New Orleans, La.

*May 31—June 1-2*—Canadian Electric Railway Association, annual convention, Winnipeg, Man.

*June 6-8*—American Association of Engineers, annual convention, Tulsa, Okla.

*June 24-25*—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

*July 27-29*—Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.

*Oct. 3-7*—American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio.

suggested, however, that 150 ft. be the minimum width of the garage. Pits should be flush with the floor, with no curbing, thus providing for additional storage space with the pits not in use. An attempt has been made by his department to standardize small part fittings and units. He felt, however, that there was hardly a chance of standardizing the entire coach due to the rapid development in design and construction.

At the Springfield Engineers' Club dinner, Thursday evening, the new chairman of the Illinois Commerce Commission, David H. Jackson, spoke about the extensive work of that commission in giving fair regulation to 700 utilities, exclusive of bus lines and steam railroads, with a valuation of $1,600,000,000. He contended that in the past railways have relied too much on legal help to obtain raises in rates, which could be obtained with less effort if the utility would improve its service, spending the money in betterments.

### Municipal Ownership Aired at Friday Joint Session

Following the report of the Illinois Committee on Public Utility Information, read by J. F. Gilchrist, chairman, Prof. H. B. Dorau, research assistant Institute for Research in Land Economics and Public Utilities, Northwestern University, explained by charts and data the transition which is taking place with respect to municipal ownership of power companies. Changing conditions have been responsible for the installation of municipally owned plants and their subsequent acquisition by privately owned power systems.

Dr. H. M. Gray of the University of Illinois explained in detail the courses given there in public utility work. While the university can teach the fundamentals, it is necessary that the students, both undergraduate and graduate, be given practical experience in the public utility plants.

Methods developed and used in the shops of the Illinois Traction System at Decatur were explained by J. D. Barnhart, superintendent, in a paper dealing with "Interurban Maintenance and Shop Practices." Mr. Barnhart dwelt upon four shop practices, namely, moving trucks from under cars, removing compressors, babbitting armature bearings and painting the equipment. An abstract of Mr. Barnhart's paper will appear in a later issue.

### Mechanical Men Must Keep Up to Date

Henry Cordell, master mechanic Chicago, North Shore & Milwaukee Railroad, discussed Mr. Barnhart's paper with a description of shop practices on the North Shore Line as compared with those employed in the shops of the Illinois Traction System. He felt that the present-day mechanical force must look to its laurels if it is to keep abreast of modern car design and construction. He referred to the truck exhibited by Mr. Blackhall as an example of what to expect in the future.

What modernization in car equipment will do to an electric railway property was given in a paper read by M. J. Oswald, sales representative St. Louis Car Company. Mr. Oswald took the facts and figures already presented in ELECTRIC RAILWAY JOURNAL'S new car story and supplemented these with suggestions of improvements on newer cars.

Following Mr. Oswald's paper, Mr. Blackhall gave figures on the result of new car operation by the Chicago & Joliet Electric Railway. For the six months period prior to installation of ten new cars costing $170,000 on the interurban lines of the system, the revenue on the city lines increased 1 per cent and on the interurban lines 0.65 per cent. For the six-month period following installation of the new cars, the revenue on the city lines decreased 0.47 per cent, while the revenue on the interurban lines increased 6 per cent, or $9,656. At this rate the new cars show an increased earning capacity of $20,000 per year. During this six months, however, the cars showed a saving in operating expenses of $17,000. If this continues for the next six months, the saving will amount to $34,000 for the year. Thus, with an investment of $170,000 the company has an indicated return of $54,000 per year, or almost 33 per cent on the investment.

How track is maintained on the largest electric railway property in the world was detailed in a paper read by Jonathan Wolff, assistant supervisor of track and roadway Chicago Surface Lines. Four points were brought out by Mr. Wolff as important in trackwork. These were: (1) Improved organization, (2) use of power tools, (3) electric welding, (4) safety precautions. Mr. Wolff's paper will be abstracted in a later issue.

Officers elected for the Illinois Electric Railways Association for the coming year are:

President, G. W. Welsh, vice-president East St. Louis & Suburban Railway.

First vice-president, Ray Palmblade, Illinois Power & Light Corporation.

Second vice-president, C. H. Jones, Chicago, South Shore & South Bend Railway.

Executive committee, the officers and B. I. Budd, Chicago; W. H. Sawyer, East St. Louis, and H. M. Lytle, Chicago.

# One Man Better than Two*

By R. F. Palmblade
Manager Peoria Division Illinois Power & Light Company

ONE-MAN operation of city street cars is nothing new; in fact, as most transportation people well know, one-man operation of city horse cars was universal in early city transportation. However, development of the automatic pneumatic devices on street cars was, to my mind, the first attempt along sound engineering lines toward designing equipment with the working parts so co-ordinated and simplified that one-man operation of the unit as a whole was comparatively easy. After the car had been developed the first thought in the mind of the public was that the plan was simply one of eliminating the wages of one man on each car. This, in turn, suggested slower operation and less safe operation, for the reason that it seemed a natural deduction that two men could handle a car with more speed and in a safer manner than could one man. Some of you will, perhaps, recall that this view was shared, in part at least, by some of the executives in the industry. Of course most of us, as transportation men, knew that the theory of one-man operation was sound.

Let it be said, for the good judgment and loyalty of the car operators as a whole, when the new system was adopted they, as a rule, were not insensible of the advantages of this idea to the public, the companies and, directly and indirectly, to themselves, and, in general, they co-operated in a wholehearted way. Most of the foregoing applies to companies in cities of moderate size, which, of necessity, were usually the first to establish one-man operation. The idea is still growing, however, because, after all, facts are facts and cannot be controverted. There still are, perhaps, areas so congested from a traffic standpoint that two-man operation is still necessary. In areas of moderate traffic density an approximation of two-man operation in those particular sections can be worked out, still retaining the one-man principle.

### Reduces Accidents

There are some advantages to the public in this scheme, most of which were elaborated upon when the cars were inaugurated. Notwithstanding the increase in the average fare compared to a few years ago, on most properties it would undoubtedly be higher if it were not for the one-man car. The positive decrease in accidents per unit of miles operated and the fact that boarding and alighting accidents are almost a negligible quantity on one-man operated properties that employ the latest automatic pneumatic devices on their cars is a positive advantage to the public and one not to be lightly considered. On the Peoria Division of the Illinois Power & Light Corporation they do not average over one or two accidents of this type per year on the property. The accidents mentioned are of an insignificant nature, comparatively speaking, such as a heel catching in a folding step, which is not the fault of the equipment nor the car operator.

In this day of automatic traffic signals in our city streets the rider on a modern one-man car has a decided advantage in time saved, as the car operator can immediately proceed with the green light without waiting for the customary bell signal, which is usually necessary on a two-man unit. The pneumatic safety devices on the car, in conjunction with the automatic platform signal, permit the one-man car operator to take advantage of seconds,

*Abstract of a paper read before the Illinois Electric Railways Association, Springfield, Ill., March 17, 1927.

which in the aggregate through a day's run total many minutes. This is an undoubted advantage to the passenger, as he feels the operator has a chance to be alert and avoid the little trifling delays that irritate the public. Perhaps, in addition to the time saved, there may be that a little psychology enters into the passenger's demand to be on the move. Notice the auto driver who fails to start instantly on the green traffic light and listen to the chorus of sirens and horns. In the old days traffic flow was measured in minutes, but it is now measured in seconds —consequently, every second gained by one-man equipment eventually redounds to the benefit of the public.

### Improved Devices Save Time

In order to call attention to one of the advantages of one-man operation, it is perhaps permissible to dwell a moment on one of the arguments against the plan. For instance, it has been said that, in areas of heavy traffic density, one man on a street car cannot handle the business as rapidly as can two men. This is true if the unit is obsolete and old-fashioned schemes of handling fares and transfers are used. It has been demonstrated that if the one-man car has pneumatically operated twin front doors, so as to handle simultaneously outgoing and incoming files of passengers, and, in addition, has a rear door pneumatically operated where passengers can board with the assistance of a street fare collector, less time will be taken in loading the car than under the two-man system.

Ordinarily, with two-man operation, passengers board at one end of the car and pay their fare to one of the operators. With a street collector both he and the operator collect fares from separate files of passengers without interference from the outgoing file. It is needless to point out that the street fare taker is usually necessary only during the peak-load periods. This is a distinct advantage to the public because it facilitates loading beyond ordinary two-man operation and, again, time is saved to the passenger, to say nothing of largely eliminating crowding in boarding. Also, the advantage of prompt handling is available to the public when it really wants it, i.e., during the peak-load periods.

One-man operation has stimulated the development of the modern transfer, which has a higher degree of visibility through more simple arrangement, together with the elimination of cumbersome complex markings and punchings. The modern transfers require no punching by the operator while he is actually operating his car and may be torn off the pad as rapidly as giving out rain checks at a ball park. It seems to me that without the stimulus of relieving the one-man car operator of tedious duties the transfer would not be so far advanced in design. This is a direct advantage to the public, and further, it puts the one-man car on a parity with the two-man car in so far as speed in issuing transfers is concerned.

Speed in collection and registration of fares has been spurred by the widespread use of one-man cars in city service. Where registration is still followed automatic, speedy equipment has made it easier for the passengers to file into the cars without confusion and delay in loading. This all tends to a better relationship between the public and the company.

The passenger-actuated and pneumatically operated treadle exit on the rear of modern one-man cars permits the passenger to leave by the rear without waiting until a conductor has determined whether the car has stopped before opening the rear door. With this new device, immediately upon the car coming to a stop the rear door exit is at once available and there is no waiting for the conductor to close the rear exit and give the motorman the starting signal. This selectivity at the personal convenience of the passenger has a tendency to please, which is most assuredly an advantage to the public.

In cities where one-man operation has been given a fair test with modern equipment it has been proved to the entire satisfaction, not only of the operating companies but of the public as well, that one-man cars produce a more economical, a safer and a more satisfactory transportation service. The time may come when a man on the rear end of a street car will be unnecessary except perhaps in extreme cases. Even these extreme conditions have a way of solving themselves, due to advancement in the design of equipment and accessories.

The average American of today has developed what might be termed an "automobile sense." He likes decision, alertness and speed, to say nothing of safety, in his city transportation. The automobile driver will brook no interference in the handling of his car, particularly from the back seat. It is not the duties a driver performs in running an automobile that distract his mind, because these duties become mechanical, but rather the interference from other occupants of the car. So the average individual is content to permit one man to handle a public vehicle, knowing that it is an advantage to him as a passenger to have one man absolutely responsible. He knows that there will be no confusion resulting from a multiplicity of bell signals to the motorman, and that there will be no back-seat driving. The psychology is apparent.

### Advantages of One-Man Operation

Our experience has shown that with the one-man operation it is possible to furnish more frequent service by the use of a larger number of smaller transportation units; a faster service by the use of a lighter car, capable of quicker acceleration; a more comfortable ride, by reason of the supplying of modern type of carrier; a safer ride, because of the automatic air brakes and the various pneumatically operated devices that have been outlined, including door-closing and step-raising equipment.

From the standpoint of the company, the use of the one-man car has decreased the cost of operation, since it uses less current and because of lighter weight does not require the high maintenance cost for track and roadway. While the saving in wages paid to car operators is negligible, because of the larger number of units operated, and a higher basic wage paid to the operators, still there has been some economy effected from the wage standpoint.

Were it not for the one-man type of operation the public would be paying much more today for a street car ride and many transportation systems would long since have passed out of existence.

# Decision on Inspection and Testing of Electric Locomotives

PURSUANT to a petition of the American Electric Railway Association a hearing was held before the Interstate Commerce Commission Nov. 1, 1926, in regard to the rules and instructions for the inspection and testing of locomotives propelled by power other than steam. A decision has just been rendered. The primary question involved was whether or not the railway companies included in the membership of the association are subject to an order of Dec. 14, 1925, in so far as it relates to electric locomotives used or permitted to be used on lines operated by members of the American Electric Railway Association.

Questionnaires were sent to the respective carriers calling for data showing the general character of their lines, the equipment used thereon and the nature of the traffic handled. The association contended that the locomotive inspection law as enacted does not apply to electric locomotives or electric apparatus and, second, that the law as enacted does not apply to any electric railway unless such railway is being operated as an integral part of a general steam railroad system.

The Interstate Commerce Commission decided that this ruling applied to 116 carriers. To decide which were street, suburban or interurban electric railways, the carriers were considered individually. Returns to the questionnaires indicated that only one of the carriers is operated as a part of any other railroad. After careful consideration of the matter, it was decided that the carriers listed below, as at present operated, are street, suburban or interurban electric railways, not operated as a part of a general railroad system of transportation, and that they do not fall within the scope of the locomotive inspection act as enacted:

Berkshire Street Railway.
Hudson Valley Railway.
Hull Electric Company.
Kansas City, Clay County & St. Joseph Railway.
Key System Transit Company.
Massachusetts Northeastern Street Railway.
Milwaukee Electric Railway & Light Company.
Muskogee Electric Railway.
Omaha, Lincoln & Beatrice Railway.
Quebec Railway, Light & Power Company.
San Francisco, Napa & Calistoga Railway.
Southern Indiana Gas & Electric Company.
Tennessee Electric Power Company.
United Electric Railways Company.
Wiles-Barre & Hazleton Railway.

Wisconsin Power & Light Company.
York Utilities Company.
Kansas City Public Service Company.
Springfield Street Railway.
Worcester Consolidated Street Railway.

The record shows that no locomotives are used on the lines of the following carriers and therefore it is not necessary, at this time, to determine whether these carriers are subject to this act:

Alabama Power Company.
Androscoggin & Kennebec Railway.
Auburn & Syracuse Electric Railroad.
Augusta-Aiken Railway & Electric Corporation.
Aurora, Elgin & Fox River Electric Company.
Bangor Hydro-Electric Company.
Beaver Valley Railroad.
Benton Harbor-St. Joe Railway & Light Company.
Capital Traction Company.
Chicago, South Bend & Northern Indiana Railway.
Cleveland Southwestern Railway & Light Company.
Cortland County Traction Company.
Cumberland County Power & Light Company.
Dayton & Western Traction Company.
Denver & Interurban Railroad.
Elgin & Belvidere Electric Company.
Fresno Traction Company.
Indiana, Columbus & Eastern Traction Company.
Indiana Service Corporation.
Indianapolis & Cincinnati Traction Company.
Lehigh Valley Transit Company.
Marion and Bluffton Traction Company.
Michigan Electric Railway.
New Castle & Lowell Railway.
New York & Stamford Railway.
Northern Ohio Power & Light Company.
Ohio Public Service Company.
Ohio Valley Electric Railway.
Olean, Bradford & Salamanca Railway.
Peninsular Railway.
Northwestern Electric Service Company of Pennsylvania.
Rochester, Lockport & Buffalo Railroad.
Sioux City Service Company.
Southern Ohio Public Service Company.
Springfield & Xenia Railway.
Steubenville, East Liverpool & Beaver Valley Traction Company.
Toledo, Fostoria & Findlay Railway.
Toledo, Ottawa Beach & Northern Railway.
Union Traction Company of Indiana.
Washington, Baltimore & Annapolis Electric Railroad.
Washington-Virginia Railway.
Western Ohio Railway.
Winona Service Company.
Lima-Toledo Railroad.
Central California Traction Company.
Milwaukee Northern Railway.

The carriers listed below failed to file returns to the questionnaire, and no evidence was offered at the hearing with respect to the character of such lines, the equipment used thereon or the nature of the traffic handled by them. In the absence of evidence in these respects the Interstate Commerce Commission expressed no opinion as to whether these carriers are subject to the act and the rules and instructions established thereunder. To such carriers the relief granted herein does not apply.

Atlantic City & Shore Railroad.
British Columbia Electric Railway.
Cincinnati & Dayton Traction Company.
Cincinnati, Lawrenceburg & Aurora Electric Street Railroad.
Dayton & Troy Electric Railway.
Dayton, Springfield & Xenia Southern Railway.
Empire State Railroad.
Holyoke Street Railway.
Lake Shore Electric Railway.
New York State Railways (Rochester Lines).
Rochester & Syracuse Railroad.
Rockford & Interurban Railway.
Scioto Valley Railway & Power Company.
Trenton-Princeton Traction Company.
West Chester Street Railroad.
Youngstown & Suburban Railway.

The Interstate Commerce Commission found that the carriers listed below cannot properly be classed as street, suburban or interurban electric railways and are therefore subject to the locomotive inspection act, as amended:

Arkansas Valley Interurban Railway.
Bamberger Electric Railroad.
Chicago, Aurora & Elgin Railroad.
Chicago, North Shore & Milwaukee Railroad.
Des Moines & Central Iowa Railroad.
Detroit United Railway.
Fonda, Johnstown & Gloversville Railroad.
Illinois Traction, Inc.
St. Louis Electric Terminal Railway.
Interstate Public Service Company.
Lackawanna & Wyoming Valley Railroad.
Northeast Oklahoma Railroad.
Pacific Electric Railway.
Portland Electric Power.
San Francisco-Sacramento Railroad.
Southern New York Railway.
Terre Haute, Indianapolis & Eastern Traction Company.
Tide Water Power Company.
Waterloo, Cedar Falls & Northern Railway.
Sacramento Northern Railway.
Salt Lake & Utah Railroad.
Cedar Rapids & Iowa City Railway.
Utah Idaho Central Railroad.
Chicago, South Shore & South Bend Railroad.
Pacific Northwest Traction Company.
Yakima Valley Transportation Company.
Visalia Electric Railroad.
Petaluma & Santa Rosa Railroad.
East St. Louis & Suburban Railway.
Evansville & Ohio Valley Railway.
Grand Rapids, Grand Haven & Muskegon Railway.
Mason City & Clear Lake Railroad.
Pittsburg County Railway.
Toledo, Bowling Green & Southern Traction Company.
Washington & Old Dominion Railway.

At the hearing testimony was offered on behalf of the carriers attempting to show that some of the rules and exceptions included in the order of Dec. 14, 1925, should be changed in order to make them applicable to locomotives used on their lines. The commission decided that Rules 223, 225, 226, 227, 238 (d), 239 (b) and 253 should be given further consideration before they are made effective on locomotives used by such of these lines as are subject to the act, but that the remaining rules should be made effective promptly.

The order of the commission was that on and after the first day of June, 1927, except as otherwise specified, the rules and instructions for the inspection and testing of locomotives propelled by power other than steam, together with such tables, drawings and forms approved by said order of Dec. 14, 1925, shall be effective and shall be observed by each and every common carrier subject to the act aforesaid as minimum requirements except with respect to locomotives used on the lines particularly named below, the specified dates included in the rules 213 (b), 214 (a), 231 (f), 317 (a) 328 (a), 329 (a) and 337 shall be extended for a period of eighteen calendar months and until further order the requirements of rules 223, 225, 226, 227, 238 (d), 239 (b) and 253 shall not be effective.

The carriers referred to above are:

Arkansas Valley Interurban Railway.
Bamberger Electric Railroad.
Chicago, Aurora & Elgin Railroad.
Chicago, North Shore & Milwaukee Railroad.
Des Moines & Central Iowa Railroad.
Detroit United Railway.
Fonda, Johnstown & Gloversville Railroad.
Illinois Traction, Inc.
Evansville & Ohio Valley Railway.
Grand Rapids, Grand Haven & Muskegon Railway.
Mason City & Clear Lake Railroad.
Pittsburg County Railway.
Toledo, Bowling Green & Southern Traction Company.
Washington & Old Dominion Railway.
St. Louis Electric Terminal Railway.
Interstate Public Service Company.
Lackawanna & Wyoming Valley Railroad.
Northeast Oklahoma Railroad.
Pacific Electric Railway.
Portland Electric Power Company.
San Francisco-Sacramento Railroad
Southern New York Railway.
Terre Haute, Indianapolis & Eastern Traction Company.
Tide Water Power Company.
Waterloo, Cedar Falls & Northern Railway.
Sacramento Northern Railway.
Salt Lake & Utah Railroad.
Cedar Rapids & Iowa City Railway.
Utah-Idaho Central Railroad.
Chicago, South Shore & South Bend Railroad.
Pacific Northwest Traction Company.
Yakima Valley Transportation Company.
Visalia Electric Railroad.
Petaluma & Santa Rosa Railroad.
East St. Louis & Suburban Railway.

# American Association News

## Exhibit

PLANS for the annual exhibit at the 1927 convention were made and adopted at a meeting of the exhibit committee of the American Association held in the office of Col. J. H. Alexander, Cleveland, Ohio, on March 18. Those present were J. H. Alexander, chairman; C. E. Morgan, vice-chairman; T. O. Kennedy, vice-chairman entertainment committee; J. W. Welsh, executive secretary; F. C. J. Dell, director of exhibits; F. W. Campbell, secretary Cleveland convention committee; F. B. Bullock, assistant secretary Cleveland convention committee; J. W. Kellison, L. D. Bale, John Bender representing Herman Bender, C. P. Billings, R. M. Campbell, C. H. Clark, S. G. Down, Charles Gordon, R. N. Graham, H. F. Flowers, R. A. Hauer, C. S. Hawley, B. A. Hegeman, Jr., A. P. Jenks, J. E. Lytle representing H. J. Kenfield, A. F. Paul representing T. W. Casey, L. C. Paul representing J. C. McQuiston, A. L. Price, A. M. Robinson, S. P. Seward, L. W. Shugg and R. L. Twitchell. Mr. Dell was elected secretary of the meeting.

Mr. Dell presented a report outlining the work which has been done already. A contract has been drafted under which the exhibition is to function. In general this follows that of last year. The local contractors have been reappointed and the rates for service are in line with those quoted last year. Resolutions of the executive committee passed at its meeting on Feb. 4 were referred to, relative to outside bus demonstrations and other exhibits away from the convention, the setting aside of a special day for exhibits and arrangements for inspection trips. Mr. Dell's report was accepted and ordered spread upon the record.

Minutes of a special sub-committee to lay out a floor plan for the exhibit met at Cleveland on March 17. On account of building operations it was recommended to erect a temporary structure on East Sixth Street to be used as the exclusive entrance, with exits at the St. Clair end of East Third Street and at the St. Clair end of the auditorium

Representatives present at the meeting of the exhibit committee held in Cleveland, Ohio, March 18

on East Sixth Street. Several changes from last year's layout of meeting rooms and exhibit facilities were made. It was recommended to retain the Arena layout of last year. A plan for Exhibition Hall, the floor below the arena, was presented by the sub-committee and adopted. It was decided to provide rooms on this floor for meetings of the Accountants', Claims, Engineering and Purchasing Agents and Storekeepers. The balance of the space on this floor is to be used for exhibits. It was felt by the committee that this arrangement would be more satisfactory to exhibitors than that of last year.

The 1926 track layout was approved. Since a large car exhibit is expected, additional track space will be provided, if necessary, by closer spacing of the cars. The committee was in favor of stimulating by every means possible the exhibition of truck and car improvements by both manufacturers and operators. The chairman outlined a plan for squaring off the West Wing in the event that the Cleveland and Industrial Exposition's sale of space warrants. After discussion it was recommended that the meeting room space of last year be divided into exhibition space and that the American and T. & T. meetings be held in a new building to be erected on the north plaza, just north of the esplanade. If this building is not erected, it was voted that the meeting rooms of these two associations be retained in the same location as last year. In the event that the West Wing is extended, the committee voted authority to the director of exhibits to subdivide and sell the space to exhibitors. It was decided that Wednesday, Oct. 5, be designated as Exhibit Inspection Day.

Mr. Welsh outlined the budget for this year as compared with 1926 and explained that while the rental for the buildings will be reduced other expenses will increase. These include a greater expenditure for entertainment, general printing, including registration books not published last year, and contingencies. Having in mind that there was a deficit last year it appeared desirable to charge the same rates for space. It was voted to recommend to the executive committee rates of 75 cents per square foot for inside space, the same as last year; 45 cents per square foot for outside space and $3 per lineal foot for track space

After considerable discussion a motion was passed unanimously recommending to the executive committee that the exhibits be opened at noon on Saturday, Oct. 1, instead of on the following Monday morning, when the convention itself is opened. Members of the committee representing various important exhibitors were in accord with this proposal, since it permits delegates arriving early to have additional time for inspection of the exhibits and tends to encourage early arrival by delegates and full attendance at the convention meetings.

It was voted that diagrams be prepared and contracts be submitted by Mr. Dell to prospective exhibitors on May 16, with the understanding that they have until June 15 to return formal space applications. It was further voted that a meeting of the committee for the purpose of assigning space be held in Cleveland at 10 a.m. on June 22.

## W. & S. Special Committee No. 9

WAY and structures special committee No. 9 met in association headquarters in New York on March 2 and 3, with the following present: J. R. McKay, chairman; Adrian Hughes, Jr., L. F. Parlette, A. J. Blackburn, W. W. Wise, G. H. Haldeman and G. C. Hecker, association representatives.

Practically the entire meeting was devoted to a complete review and discussion of the effect of garage design on insurance rates. The tentative draft of the regulation for bus garages which has been prepared by the general garage committee of the National Fire Protection Association was carefully examined and discussed. Mr. Hecker, who is the association's representative on the N.F.P.A. conference committee on motor bus garages and hazards, explained the regulations and answered a number of questions concerning them.

It was decided that in addition to the assignment of garage design and its effect on insurance rates, the committee would consider only the three additional subjects of (a) door design, (b) bus washing facilities, (c) ideal layouts for various street frontage conditions. Sub-committees were appointed to obtain the necessary data for the investigation.

A tentative plan for a meeting in Pittsburgh in the latter part of April was proposed.

## Service Betterment

REPORTS of sub-committees occupied the meeting of the committee on service betterment of the Transportation & Traffic Association held at association headquarters in New York on March 1. The following were present: S. E. Emmons, chairman; C. D. Smith, vice-chairman; A. C. Spurr, W. L. Barclay, Jr., representing E. A. Palmer, J. R. Ong representing J. B. Stewart, Jr., C. A. Burleson representing J. C. Thirlwall and W. B. Wheeler representing W. E. Thompson.

The meeting began with a report on "Convenience and Attractiveness of Service," by C. D. Smith, chairman of the sub-committee on this subject. Eight main topics were given consideration as essential. In the discussion which followed a number of additional topics were suggested for inclusion in an appendix to the report.

In the absence of J. A. Dewhurst, Mr. Smith also presented the report of the sub-committee on car design. In the discussion which followed quite a number of elements in car design were advanced as being very desirable in modern car design. The suggestions made covered in detail the following:

1. Adherence to A.E.R.A. standard double-truck car design.
2. Adequate ventilation should be more carefully studied.
3. Noise reduction should be carefully studied, taking into consideration noises caused by gears, air compressors, brake rigging, etc.
4. Cars should be designed so that they may easily be kept clean.
5. Careful attention should be given to interior and exterior finishes.
6. Giving cars names instead of numbers, as the possibility of stimulating local interest and friendly comment on small properties.
7. Push buttons should be in convenient reach of every seat.
8. Cars should be comfortably heated.
9. Cars should contain a maximum number of cross seats, spaced far enough for comfort.
10. The question of de luxe seats should be considered.
11. Cars should be illuminated so as to give the most restful and efficient lighting to passengers.
12. The design of hand straps, hand stanchions, bell cords, register cords, etc., should be carried out to give the least offense to passengers.
13. Ample floor space should be provided for passengers during fare payment.
14. Aisles should be of liberal width.
15. Circulating movement of passengers should be provided whenever possible.
16. Side windows should be provided with shades.
17. Floor levels should be kept down to a minimum.
18. Double-truck cars are preferable to single-truck cars in selling service, even on the small properties.

The final report of the session on "Speeding Up Service" discussed eleven points which should be given consideration whenever the question of speed is taken up. Later discussion by the committee emphasized the difference between the viewpoints of the operator and the public on the problem of speed.

# The News of the Industry

## $300,000,000 Subway Measure Passed by New York Legislature

Following favorable action by the New York Assembly, the Senate on March 23 passed by unanimous vote the resolution for the constitutional amendment to extend New York City's borrowing capacity by $300,000,000 for subway construction.

With the passage of the $300,000,000 amendment came word that Mayor Walker was planning a speaking tour to make sure that people throughout the state should become acquainted with the merits of the proposal before the referendum next fall. He is to open his campaign at Niagara Falls, where he will address the Summer Conference of Mayors on May 31. Several other dates for speaking engagements upstate will be arranged.

Mayor Schwab of Buffalo and Mayor Hanna of Syracuse, both of which cities have stakes in the amendment on account of provisions for increasing their debt limits, will join Mayor Walker on the stump. Since they are Republicans it will be a non-partisan effort to get voters outside of the cities to ratify the measure.

## McChord Report on Philadelphia Presented

Charles C. McChord's report on the transit situation of the city of Philadelphia was submitted to the Public Service Commission of Pennsylvania on March 23. He suggests acquisition by condemnation of the underliers of the Philadelphia Rapid Transit Company as a step toward the city's becoming landlord of the existing system. He further suggests "condemnation of the P.R.T." While he apparently regards these steps as essential, he says that the rest of the plan should be carried forward immediately so as to achieve at once the following results:

1. Immediate operation of Broad Street subway without increase in fare.
2. Limitation of P.R.T. earnings to present dividends with payment of all surplus to the city.
3. Provision for increased sinking fund, sufficient by 1957 to purchase the P.R.T.
4. Local initial control by the city of all questions of service, fares and finance.

He would set up as a machinery to accomplish these results a local body with some such name as the Philadelphia Transit Conference Board, to consist of three members, one to be appointed by the city, one by the Public Service Commission and one by the company.

He says that it may be the wisest plan to acquire the underliers by condemnation with borrowed money and to acquire the P.R.T. in 1957 under the 1907 contract option "with the accumulated surplus." He feels that this latter step should be coupled with a definite limitation of dividends and complete control by the city of all the railway company's surplus earnings.

Through the direct expedient of underlier condemnations Mr. McChord sees an annual saving of $4,500,000 in the charges against gross revenue. According to him, this saving would be sufficient to permit a substantial reduction in present fares and very possibly an early return to the 5-cent fare "if this is desired."

Mr. McChord and his staff have been engaged in the survey for the last three months. During this same period the engineering bureau of the commission has been at work on a survey of service conditions of the Philadelphia Rapid Transit Company. A report based on these findings is expected to be filed within the next few weeks.

As the Philadelphia *Ledger* sees it, "the report justifies the hope that it will be made the basis for permanent adjustment of the relations between the city and the P.R.T., for it points the way not only to the lifting of the millstone of the rentals from the necks of the car riders but to a fair division of the cost of the city's high-speed transit facilities between the riders and the taxpayers."

## Kansas City Franchise Passed

### New 30-Year Grant in Favor of Kansas City Public Service Company Signed by Mayor—Reduction of Fares Effective Upon Franchise Acceptance

By a unanimous vote on the night of March 21 the City Council of Kansas City, Mo., granted a new 30-year franchise to the Kansas City Public Service Company. Mayor Albert I. Beach signed the document. It will become effective on March, 31, if accepted. The new franchise replaces the old franchise of the Kansas City Railways, known as the Jost franchise and passed in 1914 in the Jost administration.

Under the terms of the new grant a small reduction in fares is to be made immediately upon acceptance of the grant. The new rates will be fifteen tickets for $1, ten tickets for 70 cents. Until acceptance present fares, at the rate of two tokens for 15 cents and a cash fare of 8 cents, will remain effective. When purchased in the form of tickets in the larger quantities, fares will be one-third of a cent less than the present rates.

The city administration was for a time loath to grant any new franchise or an extension of the old one. With a change in the character of city government last summer, the new City Council granted a twelve-year extension to the Jost franchise, but a demand arose for a public referendum in the matter. Subsequently, the officials of the Kansas City Public Service Company asked that an entirely new franchise, mutually satisfactory to the city and to the operating company, be drafted and passed.

Since that time a special franchise committee of the City Council has been engaged in drafting a new instrument, details of which have been up for discussion almost every week in hearings to determine the public attitude toward the various tentative provisions of the new grant.

W. G. Woolfolk, president, has indicated that the Kansas City Public Service Company will accept the franchise at once.

Some of the principal provisions of the new franchise follow:

Time limit of the grant is 30 years, replacing the old franchise, which had eighteen years of unexpired term.

Bus franchise is considered separate from this grant, the company being required to follow the provisions of the present bus grant, which has an unexpired term of 1½ years.

No valuation on the properties is stipulated, but a return of $2,000,000 a year is permitted, plus 8 per cent on any new capital invested.

Fares are to be: Fifteen tickets for $1; ten tickets for 70 cents; two tokens for 15 cents and one cash fare for 8 cents; conductors on all cars to have the $1 books of tickets for sale.

The universal transfer system must be continued after the manner now in vogue here.

In accepting the franchise, the company agrees to consider income from the fare schedule of the franchise sufficient compensation, without recourse to the State Public Service Commission for increase in fares.

When the fare-reduction fund reaches an amount of $100,000, fares must be reduced by one-sixth of a cent; any surplus over the stipulated $2,000,000 a year and 8 per cent of the new investment must be added to the fare reduction fund.

The company must spend $6,600,000 on the property within the next three years, half for betterment of the service and equipment and half in repairs only. The first of these amounts is to be added to the capital account, but not the second.

Ordinary maintenance and repairs are to be taken care of by setting aside 16 per cent of the gross income each year, in addition to the $3,300,000 mentioned in the preceding paragraph, the unused amount of the 16 per cent to revert to the fare reduction fund.

Before the company may undertake any program of extraordinary maintenance, and then only in great emergencies, it must set aside a reserve fund of $400,000, interest on which, at 5 per cent per annum, must be paid into the fare reduction fund.

Two members of the company's board of directors are to be appointed by the city.

Violation of any single provision will be sufficient reason to rescind the entire grant upon a vote of the City Council

The company may mortgage its property up to $17,500,000 plus 75 per cent of new capital invested.

Possible proceeds from the sale of any of the property are to be spent in improvements of the remaining property and cannot be considered in the capital account upon which the 8 per cent dividend is allowed; while such proceeds remain unspent as provided, the company must pay

5 per cent of the amount per annum into the fare reduction fund.

Should extraneous causes increase the average operating costs by 5 per cent in any one year, the company may apply to the Public Service Commission for an increase in fares.

## Paving Relief Measure Lost in Grand Rapids

Despite the loss of the measure to relieve the Grand Rapids Railway, Grand Rapids, Mich., from some of the costs of paving between its tracks, submitted to the voters on March 7, the Grand Rapids *Herald* regards it as a far cry from the old days of universal antipathy to public utilities to the results of the election, "when 3,375 out of 7,987 who voted favored a measure for relieving the railway from a tax load." The *Herald* says that "twenty years ago no scheme that offered even a crumb to any utility corporation could have hoped for one out of ten votes in a municipal election, whereas Monday's results show more than 40 per cent favorable to the railway."

The proposal lacked only 815 votes to carry, being a majority proposition. Analysis reveals that the adverse vote was probably due to the short time permitted for the railway's campaign, after the issue was initiated, in which to inform and educate the voters. The wording of the amendment also is believed to have had something to do with negative voting. City officials and prominent citizens supported the amendment by speaking in its behalf, but they were faced with an optional clause in the amendment that left a doubt in the mind of the property owners of how the cost was to be apportioned in all paving contracts. This was difficult to wipe away. The belief exists now that even if there had been a clean-cut elimination of costs with the paving expense charged to the general tax fund, the result might have been different.

The day of the election was not conducive to voting. It was so rainy and dismal that many women voters friendly to the company were kept away from the polls. Another thing, a 2½ mills tax levy to aid the city in meeting major improvements was initiated just before the primaries and injected a factor into the campaign.

In commenting the *Press* said:

The *Press* is of the belief that when voters have been cured of the delusion about a "guarantee" and are able to look at this problem in the right light, it will not be difficult to change the slight minority of Monday's balloting to a majority. But that will require a greater interest on the part of intelligent citizens than was displayed in the turnout at this primary.

The *Herald* said:

Upon the matter of paving between street car tracks, the probabilities are that the point which was deemed strongest in favor of the proposition is the real cause of its defeat. Those who advocated the charter amendment pointed out that it would not assuredly remove the paving burden from the railway, but rather would place upon the City Commission the responsibility of deciding each individual paving project separately. Commissioner Sweet, who earnestly advocated the amendment, believed that the railway should continue to pay for paving on residence streets. But there was nothing in the proposed amendment which guaranteed such procedure. That being the case, the voters, in order to protect owners of residence property on car lines from being burdened with increased taxes, voted against the plan.

## Decision Becomes Indecision in Iowa One-Man Car Issue

When the Iowa Supreme Court on March 15 handed down a decision affirming Judge Joseph Meyer of the Polk County (Iowa) District Court, who ruled in favor of the local street car men's union in their fight to prevent the institution of one-man car service by the Des Moines City Railway, it was thought the question was settled until 1940, the date of the expiration of the two-man car agreement between the car men and the traction company. But when the high court on March 19 withdrew the opinion "for correction" it was discovered that the justices had disposed of the one-man car controversy by quoting a section of the street railway franchise of 1916, which was succeeded and replaced by the new franchise adopted in 1921 and under which the Des Moines City Railway is now operating. While the court in its brief order withdrawing the opinion give no inkling of what changes it intends to make in the ruling, it is believed by attorneys familiar with the case that the court may be forced to reconsider the entire one-man car controversy and to decide it on its merits.

The franchise of 1916 provided "that in the operation of its railway by electricity each motor passenger car shall be in control of a motorman and a conductor." In the corresponding section on motive power in the 1921 franchise this clause does not appear. Neither is it contained in any other section of the franchise. Obviously, the court overlooked this in making its decision. Referring to the discarded franchise of 1916, the court emphasized that as long as the wording of the franchise was practically identical with that of the contract between the men and the company "all parties are bound thereby," and the court finds "no ground for equitable intervention." In this manner the court passed by the question of public policy raised by the company, which contended in its arguments before both the District Court and the Supreme Court that in a city where a service-at-cost franchise is in effect any contract which prevents the city from instituting economies which would result in lower fares contravenes public policy.

The one-man car recent decision was referred to in the ELECTRIC RAILWAY JOURNAL, issue of March 19, page 548.

## Through Service on Fox River Line

The Aurora, Elgin & Fox River Electric Company installed half-hour through service from 6 a.m. to 11 p.m. connecting Aurora, Elgin and Carpentersville on March 20. John W. Gunderson, general manager, said the new schedule was in keeping with the company's policy to extend and improve its Fox River Valley service. Eight of the regulation interurban cars went into service, all one-man operated. Recent wage increases were in the nature of recompense for the added duties. Fares are scaled to the zone system, the passenger upon entering the car paying fare to a zone and upon leaving the car returning the stub to the operator. Coincident with this service, a de luxe motor coach system is to be put into effect between Elgin and Aurora, with a running time of an hour. A Fageol motor coach has been added to the equipment. Only one or two stops will be made between the terminals, affording faster time than the half-hour interurban system.

## North Shore Announces Rate Increase

An increase in interstate passenger rates on the Chicago North Shore & Milwaukee Railroad, Highwood, Ill., from 3 to 3.6 cents a mile has been announced effective at once. The new rates are made effective by authorization of the Interstate Commerce Commission, acting on the petition recently filed by the company. However, it is announced, round trip tickets between Chicago and Evanston stations and Kenosha, Racine and Milwaukee will be sold at the present rates until April 1. Intrastate commutation rates in both Illinois and Wisconsin are in no way affected by the increase, it is pointed out. The new interstate rates will make the fare one way between the Chicago Loop and downtown Milwaukee $3.06, the same as on the steam railroads, which is 49 cents more than the present rate of $2.57.

Charles E. Thompson, vice-president, in commenting on the rate increase said that recent capital expenditures in giving the public additional service through construction of the Skokie Valley route, purchase of new equipment and extensive improvements had made the advance imperative. The new rates merely placed the cost of service on a parity with that of other carriers serving the same territory.

## Philadelphia Ordinances Before Commission

Two ordinances passed by the City Council at Philadelphia, Pa., were signed by the Mayor on March 10. The first authorizes the removal of tracks from Filbert Street to make way for the city of Philadelphia-Pennsylvania Railroad boulevard and a $52,000,000 terminal development. The second gives to the Philadelphia Rapid Transit Company and the Pennsylvania Railroad bus franchise rights on the proposed boulevard. The agreement and bus ordinances now go to the Public Service Commission for approval. Signing of the agreement and ordinance by the Mayor was realized after more than a year of negotiations with the underlying companies of the Philadelphia Rapid Transit holding franchises in Filbert Street. The track ordinance authorizes the removal of rail from Filbert Street between Twelfth and Twentieth Streets. Filbert Street will become part of the Pennsylvania Boulevard connecting Broad Street with the new West Philadelphia station of the Pennsylvania Railroad. The Pennsylvania officials refused to carry out the improvement unless the tracks were removed. Abandonment of the plans meant that the plans for beautifying the city would fail.

## New Jersey Paving Bill Becomes a Law

Senate bill No. 82, relative to paving obligations by electric railway companies, was passed on March 22 by the New Jersey Legislature over the veto of Governor Moore. The bill, which becomes a law immediately, states that whenever any street railway or traction company disturbs the pavement of any street, road or highway for the construction, reconstruction, repair or removal of its tracks it must pay for the restoration of that pavement, including the base or foundation.

Work must be done to the satisfaction of the board or body having charge of such street, road or highway. A clause says that whenever any part of the pavement between the tracks and 18 in. outside of any street upon which is located the tracks has been or shall be damaged by reason of the operation of railway cars and such company at the time of the passage of this act is obligated to repair such damage and fails to repair, any state board or any political subdivision of the state having control of any such street may apply to the Board of Public Utility Commissioners for an order directing the company to make restorative repairs and this board is given jurisdiction to determine the reasonableness of any orders given.

Whenever any municipality, board or body having authority to do so shall pave or repave any street upon which are located the tracks of any railway, the company must at the same time and at its own expense put its tracks and track structure in good operating condition, but is not compelled to put down new paving around its tracks. Continuing, the bill reads:

> The obligations imposed by this act shall be and are in lieu and substitution of any and all other obligations of any such company to pave, repave or repair any street, road or highway, or to pay any part of the cost thereof except as herein provided, and may be enforced in the same manner as similar obligations are or may be enforced under the laws of this state. Nothing herein contained shall be construed to relieve any such company from the repayment of any money which has heretofore been advanced or expended by any state, county or municipal board or body having control of streets, roads or highways, for any paving heretofore done under and by virtue of a specific contract or agreement made and entered into between any such board or body and such company providing for the repayment thereof, but the obligation for such repayment shall be and remain enforceable as if this act had not been passed.

## Prizes Offered for Buffalo High School Art Students

An art poster contest open to all students of Buffalo high schools is now under way, conducted by the art department of the public schools and the International Railway, Buffalo. The contest closes March 25. The winner will be announced on April 1. Prizes will be awarded as follows: $25 first prize, $15 second prize and $10 third prize. The designs submitted are to be in two colors of suitable size for display purposes in the company's cars. The subjects selected are to be some interesting or outstanding points of Buffalo or the Niagara Frontier which can be reached by I.R.C. cars or buses. The purpose of the contest is to stimulate interest in the scenic and historical points in Buffalo and the Niagara Frontier.

## North Shore Line Erects Illuminated Signboard

In carrying its message of speed to the public traveling between Chicago and Milwaukee the North Shore Line is using a novel advertising medium in the shape of a "scene in action" sign. It is an electrically illuminated sign, the high-speed electrically operated train being painted in colors on glass. A patented disk revolving around the light to the rear makes the train appear in motion, "full speed ahead." These signs are being displayed with telling effect in various stations and store windows throughout the territory served by the company.

## M. O. Advocates Urge Traction Fund for Car Line Purchase

Appropriation of the $45,000,000 traction fund of the city of Chicago for the purchase and construction of local street car lines, as opposed to its use for downtown subway building, is the plan advocated by the Detroit Traction Plan Purchase Club in a report issued on March 8 announcing its proposal for solving the city's transportation problems by resort to municipal ownership.

In launching a campaign for city ownership of the entire surface lines system, the club, which was organized in January, urges that the city acquire these properties on the same basis the city of Detroit purchased its railway lines in 1922. According to the club's report, no constitutional amendment or new legislation, such as required by the joint surface and elevated lines franchise which is now awaiting action in the City Council, would be necessary in event of purchase by the city. Neither would it be necessary for the city to borrow money to make initial payment, if the traction fund should be appropriated, it is urged.

The plan proposes that the city take over the lines under contract, the companies to retain title until the property is paid for in installments from earnings. The purchase price would be the actual cost of the property now used and useful for street railway purposes, less depreciation from time to time.

In the purchase plan, it is also suggested that the present $16,000,000 depreciation reserve of the companies be deducted from the suggested $75,000,000 valuation, leaving a purchase price of $59,000,000. The municipal ownership advocates would have the city pay $40,000,000 from the traction fund as down payment, leaving $19,000,000 to be paid off in installments from operating profits. The remainder of the traction fund, they maintain, could be used in making immediate extensions and improvements.

With the estimated net receipts of $12,000,000 of the surface lines, the remaining $19,000,000 of the purchase price could be paid off in about five years, the plan suggests, and "leave over $7,000,000 a year to use in making extensions, improvements and renewals from earnings."

## Akron Rerouting for Economy

Beginning March 16 the first of the proposed rerouting changes in the bus transportation system of the Northern Ohio Power & Light Company, Akron, Ohio, became effective. Changes were made in the Summit Hill, Diagonal Road and the Brown Street-Lover's Lane line.

In discussing the changes in the issue of *Service News* for March 19 the company says:

> Every car and bus rider in the city of Akron is interested in keeping down fares.
>
> So is the Northern Ohio Power & Light Company!
>
> The lower car fares can be kept the better off all of us are. It is a community interest.
>
> Because of this a number of changes have been suggested in an effort to cut down the mileage that has been growing more and more month by month without a corresponding increase in riding. By cutting down the mileage, costs can be reduced and this naturally helps hold down fares. At the same time headways can be improved without much additional expense if the present duplication of service is eliminated.

## Accidents Reduced in New Orleans

Street car accidents in New Orleans, La., have virtually been cut in half since April, 1924, when the New Orleans Public Service, Inc., started its safety first campaign. The company awards a safety pennant to the carhouse which shows the lowest percentage of accidents each month. Thus far the Poland carhouse has won the pennant fifteen times and the Canal carhouse twelve times. Reduction of accidents in last four years is shown in the following figures announced by the company:

| | 1926 | 1925 | 1924 | 1923 |
|---|---|---|---|---|
| Street car accidents | 4,729 | 5.774 | 7,260 | 8,509 |
| Accidents per 100,000 passengers | 3.5 | 4.4 | 5.58 | 6.36 |
| Accidents per 100,000 car-miles | 34.1 | 41.8 | 52.2 | 58.3 |

## Vote of People Required in Tacoma

Mayor M. G. Tennent and the City Council of Tacoma, Wash., have signed an agreement not to enter into a purchase contract with the Tacoma Railway & Power Company without a vote of the people, nor to relieve the company of any franchise requirements, nor to increase the tax levy above that of the current year. The resolution was offered to kill all sorts of misleading statements made during the recent city charter campaign. Franchise requirements, which it is promised will not be altered without direction of the voters, are those regarding gross earnings tax, pavement between and along tracks and payment of half the cost of bridges.

## "Street Railways—Major Method of Passenger Transportation"

Attention has been called by the New York Trust Company, New York, in the March issue of the "Index" published by it, to the present status of electric railways. The writer reminds his readers this is still the major method of transporting passengers. Among other things the item includes a summary of the operating statistics of the 327 principal companies given in the bulletin of the American Electric Railway Association.

## Brady Awards to Be Continued

Nicholas F. Brady has authorized the resumption of the Anthony N. Brady Memorial Medal awards, through the American Museum of Safety, to the American electric railway organization which does the most to conserve the safety and health of the public and its employees. The next award will be for the year ended Dec. 31, 1926. As in previous years, the American Electric Railway Association is giving its entire co-operation. A committee has been appointed from within the industry to determine the conditions of the competition; there is also to be a committee to pass on the award.

## Work Started on $250,000 Chicago Terminal

Razing of a famous landmark of downtown Chicago—the Wells Street terminal of the Chicago Rapid Transit Lines, near Quincy Street—is nearing completion. The structure, which has seen 25 years service, will be replaced by a $250,000 passenger station for patrons of the West Side elevated lines and the Chicago, Aurora & Elgin interurban line.

The new terminal has many unusual features. The waiting room will be on the third floor at train level. On the mezzanine floor will be a ladies' rest-room, men's smoking room and trainmen's room. Space on the main or street floor will be given over to a ticket office, telephone booths, restaurant and concession counters.

A block-long, glass-inclosed steel bridge is to be erected along Wells Street, linking up the new third rail terminal and the Quincy Street station on the "L" loop. This means that passengers will be able to disembark from "L" trains at Quincy, walk a block sheltered from the weather, and step on to their suburban trains without descending to the street level.

## Terminal Under Construction in Seattle

Active construction on the proposed $500,000 interurban and bus terminal for the Pacific Northwest Traction Company in Seattle, Wash., has been started by the engineering department of Stone & Webster, working under the direction of W. D. Shannon, chief engineer. This terminal, to be built for the subsidiary company of the Puget Sound Power & Light Company, maintaining head offices in Seattle, and of which Alton W. Leonard is president, will be of fireproof, class A construction, covering an area 62 ft. x 260 ft., two stories in height It will be located on the south side of Stewart Street, covering a block from Eighth to Ninth Avenue.

Plans for the improvement were prepared by John Graham, a Seattle architect, who has designed other utility structures, including substations for the Puget Sound Power & Light Company. Mention of this project has been made previously in the pages of the ELECTRIC RAILWAY JOURNAL.

Interurban and bus terminal to be erected in Seattle

## Vote in Detroit Deferred

The plans of the Rapid Transit Commission to bring the question of subways before the voters of Detroit, Mich., at the April 4 election have been delayed. Action rescinding authority to submit the proposal was taken after Mayor Smith had pointed out possible obstructions. The plan was to construct and equip the so-called Woodward-Fort and Grand River-Gratiot subways at a total cost estimated at $125,000,000.

The Rapid Transit Commission acquiesced in the suggestion, but expressed regret that conditions seemed to make the action necessary. Mayor Smith stated that the complete lack of interest on the part of the people at the election on March 7, together with questions that have been raised, tending to cloud the issue in their minds, moved him to ask the postponement. It is further cited by the Mayor that the employment situation in Detroit is such that the mental attitude of voters might be unfavorably influenced toward undertaking large city projects.

The Rapid Transit Commission was commended by Mayor Smith for its work. He said that the recommendation for a postponement was in no way to be considered as disapproving its labors. The commission will continue its work and if, in the fall, untoward conditions do not exist the matter will be brought up again for the consideration of the Mayor and City Council with a view to putting the question to a vote.

It was the feeling of some of the city officials that the proposal was not sufficiently understood by the public to assure a favorable vote. The plan was condemned by the Mayor's finance committee in a recent report which urged that nothing be done until further study had been made. Full-page advertisements were being run in the local papers indicating the routes of the proposed system, the distribution of total cost between general taxation, special assessments and mortgage bonds, and the application of the special proximity assessments and the scale of rates recommended.

## Last Five-Cent Fare Line in Massachusetts Passes

The last electric railway in Massachusetts operating under a 5-cent fare notified the State Department of Public Utilities on March 15 that its financial condition will no longer permit such a fare and that it proposes a new fare schedule to become effective on April 15. The road is the Union Street Railway, New Bedford, which has continued the low fare except to Dartmouth and Westport, where the fare has been 10 cents long after all other electric railways increased rates. It now proposes to charge a 10-cent fare throughout.

Under the old fare the company has sold tickets at the rate of twenty-one rides for $1, except to Dartmouth and Westport, where the ticket rate has been 7½ cents per trip. The tickets to Dartmouth and Westport will be continued at the same rate, but the strip tickets in the territory generally will be sold at the rate of four rides for 25 cents, or 6¼ cents per ride.

## California Companies Seek Fare Increase

The Peninsular Railway, operating in the vicinity of San Jose, has applied to the Railroad Commission for an increase in rates. It alleges that the present rates are inadequate, that the utility had a net operating loss during 1926 of $90,952 and that its properties have a reproduction cost as of Dec. 31, 1926, of $4,525,082. Applicant asks the Railroad Commission to establish rates that will produce a fair return upon its investment in addition to operating expenses and fixed charges.

The San Jose Railroads, operating a street railway system in the city of San Jose and vicinity, has applied to the Railroad Commission for an increase in rates, alleging that it had a return during 1926 of only $12,245 and that its properties are estimated to have a reproduction cost as of Dec. 31, 1926, of $1,588,099. The commission is asked to establish rates that will produce a net return of 8 per cent.

The Stockton Electric Railroad has applied to the Railroad Commission for an increase of its rate of fare on its lines in the city of Stockton and vicinity, stating that the present fares do not produce a reasonable return upon the investment. The applicant sets forth that its properties have a reproduction cost new as of Dec. 31, 1926, of $1,160,461, and that it had a net income during 1926 of $30,089. It seeks a fair return upon the investment.

## News Notes

**Continuance of Sale of Tickets Ordered.**—The Public Service Commission of Pennsylvania on March 8 instructed the Schuylkill Railway, Pottsville, Pa., to continue to sell reduced rate ticket books containing seventeen tickets for $1. The order was issued following a complaint of the Merchants' Association of Shenandoah and the Borough of Shenandoah against a new tariff rate in which the company planned to discontinue the sale of tickets.

**Men Seek Wage Increase.**—Trainmen of the Memphis Street Railway, Memphis, Tenn., are seeking a wage increase of 10 cents an hour. Under the contract signed last year, the wage section of which expires on April 1, the scale in cents per hour is, first year men, 47½; second year men, 52½, and third year men and older, 57½. Sections of the contract pertaining to working conditions will remain in effect for another year.

**New Station Opened.**—The new Seventh Avenue station of the Queensboro subway, operated by the Interborough Rapid Transit Company, New York, N. Y., was opened officially on March 23 under an order of the Transit Commission. The service which formerly terminated at Fifth Avenue will be continued to Times Square. It seems destined to become one of the most important transfer points in the rapid transit systems. The platform is 480 ft. long and extends under 41st Street from Broadway to a point west of Seventh Avenue. At present the Queensboro subway and its branches carry about 28,000,000 passengers a year.

**Wage Increase in Aurora.**—Employees of the Aurora, Elgin & Fox River Electric Company, Aurora, Ill., have accepted the two-year contract offered by the company, which gives them an increase of 2 cents an hour to a 62-cent basis for city force employees and a 4-cent raise to 64 cents for interurban employees. The present contract expires on June 1.

**No Opposition to Fare Increase.**—No protests were presented at the hearing before the Public Utilities Commission of Utah, at Ogden, on March 14 of the Bamberger Electric Railway's request to raise one-way and round-trip first-class fares between Salt Lake and Ogden 10 per cent. Officials of the road announced that the increase would not affect student tickets. They also testified that the present revenue falls short of bringing in 6 per cent on the investment by fully $150,000 a year. The increase, they said, will bring in only an additional $12,000 a year. It is understood that the road expects its bus line to ease the burden to some extent.

**Fare Testimony in Council Bluffs.**—Special Master Claude R. Porter began collecting testimony on March 1 in the federal court at Council Bluffs, Iowa, pertaining to the fare issue of the Omaha & Council Bluffs Street Railway. In 1924 the company obtained an injunction restraining the city of Council Bluffs from interfering with increased fares the company proposed to put into effect. The city thereupon took an appeal to the United States Circuit Court of Appeals and this court sustained the injunction. The reasonableness of the fares is now up for determination. The issue involves the value of the property used in the public service, revenues, expenses and net income.

**Traveling Habits Will Be Disclosed.**—Information on the traveling habits of the shoppers of South Bend, Ind., is to be sought shortly by the Chicago, South Bend & Northern Indiana Railway in co-operation with five large department stores in South Bend. Each patron entering one of the stores will be asked by girls stationed at the entrance: "How did you come downtown to shop today? Did you walk, come by automobile, come by bus or on the street car?" The answers will be checked on a form and in this way it is expected accurate information on how people go to shop will be obtained. The totals will be made public when they are completed.

**Motorman Honored.**—Clarence Hayworth, a motorman in the employ of the United Railways & Electric Company, Baltimore, Md., has been awarded $50 for making the best record among the employees of the company in rendering painstaking, helpful public service. The award of $50 is made anonymously by "Citizen," who also made awards for bravery to members of the fire and police departments and an employee of the gas and electric company. The year for which the awards are made ended March 1. Mr. Hayworth was selected specifically for the assistance he rendered elderly persons, especially women, in boarding and alighting from his car. It was said that on one occasion he left his car to assist an aged woman into a church. The award is the fifth that has been made by "Citizen" and on each previous occasion it went to a conductor with one exception, when it was given to the operator of a one-man car.

**Students Paint Car.**—Students of Rice Institute at Houston, Tex., have painted and decorated a car of the Houston Electric Company in regular operation on the line that serves the

morning for the purpose of listening to lectures and discussing various subjects in connection with their own work. The lectures cover various subjects of broad scope, given by prominent citizens of Salt Lake City. Trainmen and other employees are invited to attend these meetings.

**Commotion Over Fitchburg Line.**—Following a request from the City Council of Fitchburg, Mass., that the Worcester Consolidated Street Railway hold in abeyance its plans to discontinue the line from Fitchburg to Worcester, Clark V. Wood, president of the company, has sent word that the request will be taken before the board of directors. Efforts are being made to have the city of Fitchburg take over the line from Fitchburg as far as Leominster. The present uncertainty as to whether the line will continue has caused widespread interest in Leominster and Fitchburg. In Leominster four petitions have been received from bus men who want to operate over the Consolidated territory in that city, but action has been held in abeyance pending developments. In Fitchburg the City Council has instructed the members of the public safety committee to do all in their power to prohibit the discontinuance of the railway either temporarily or permanently.

# Recent Bus Developments

## Railway at Indianapolis Said to Seek Coach Company

Details of contracts for purchase of the Peoples Motor Coach Company, Indianapolis, Ind., by the Indianapolis Street Railway are being worked out, it is said. The bus company now operates four main lines, some in direct competition with the railway's own motor bus routes, and has petitions before the Indiana Public Service Commission for other lines. It is said the railway would take over the buses and all leases and assets of the coach company and assume responsibility for payments of $100,000 on buses.

It was learned that the general value of the buses such as those used by the motor coach company has been held at about $10,000 to $12,000 each. With a total of 37 buses the value of the physical property of the company would be approximately $440,000, leaving approximately $60,000 to be charged to garage equipment and supplies and good will and for the certificate, if the price of $500,000 which has been mentioned is agreed upon for the deal.

## Truck Competition Hearings Held in Chicago

The Illinois Commerce Commission is soon to decide if it shall establish the precedent of permitting motor truck systems to operate as freight-hauling agencies in competition with railroads, as a result of a hearing on petitions which opened in Chicago on March 10 before Commissioner J. Paul Kuhn. Complaints have been filed by several railroads operating out of Chicago against the operation of the Interstate Trucking Company without a certificate of necessity and convenience from the commission. The trucking company has filed a petition for such a certificate.

## Rules Buses Operating Through Park Are Poor Man's Rolls-Royce

The Minneapolis, Minn., park board acted "reasonably and within its rights" when it gave bus companies the right to transport passengers over city parkways upon payment of a tonnage fee to the board, according to a district court decision. The ruling was made in connection with the motion of A. S. Dowdall, as citizen, to have the fee ordinance voided.

"The parks and parkways of the city," Judge Leary declared in his decision, "are for the recreation and enjoyment of the public—for those who can view their beauties as well from a bus as from a Rolls-Royce."

The bus concession ordinance, Mr. Dowdall contended, not only is a menace to the rights of the public but also extends to commercial transportation companies privileges beyond the powers and contrary to the traditions of the Board of Park Commissions.

The ordinance in question was passed by the park board in November of last year. It grants bus companies the right to operate through the city parks or parkways upon receipt of a permit and payment of a fee at the end of each year. This fee is limited to a minimum of $10 and a maximum of 20 per cent of the state motor vehicle tax for the particular bus.

**Buses Will Replace One-Man Cars.**—The Portland Electric Power Company, Portland, Ore., will substitute buses for the present one-man cars now in operation in the Parkrose district. The Parkrose line is to be torn up to make way for a new paved roadway along the east end of Sandy Boulevard.

**Would Substitute Buses.**—The Public Service Commission has granted the petition of the Westchester Street Transportation Company, Inc., to substitute buses for street cars on what is known as the Rosedale route in White Plains. At the hearing of this application, it was shown that by the use of buses connections could be made with the New York, Boston & Westchester line.

**Would Extend Bus Service.**—Expansion of the bus system of the Rochester lines of the New York State Railways is indicated in the petition to extend its Rochester-Penfield line to the villages of East Penfield and Marion and a movement for bus service in the Ridgeway Avenue section of Rochester. The petition for extension of the Penfield line was made to the Public Service Commission by the Rochester Interurban Bus Company, a subsidiary through which the railway operates its interurban bus system. Citizens of Ridgeway Avenue have applied to the Council for bus service.

**New Service Schedule May Be Installed.** — The Connecticut Company may install permanently a new type and schedule of service between New Britain, Conn., and Berlin, Conn., if the trial service started on March 6 meets the general requirements and approval of the traveling public. Under the plan buses will leave New Britain every twenty minutes and every other bus will continue to Meriden, as at present, but will operate through Franklin Square, New Britain. Service by trolley will be used to Berlin only when the traffic is heaviest.

**Abandons Coach Lines.**—The Pacific Electric Railway, Los Angeles, Cal., has been authorized by the Railroad Commission to abandon operation of its Clearwater-Bellflower, its Rosemead-San Gabriel and its Del Mar-New Avenue coach lines. It was decided these lines were not required by public convenience and necessity. The railway has also been authorized to discontinue operation of its coach service between Twentieth Street and Long Beach Avenue in the city of Los Angeles and the Union stock yards.

**Bus Services Enlarged.**—The Sioux Falls Traction System, Sioux Falls, S. D., has taken over the operating rights of the Worthington - Sioux Falls Transportation Company, operating buses between Sioux Falls and Mankato, Minn., by way of Worthington, according to R. C. Mills, manager of the railway. The company plans to put on its own equipment about April 1, Mr. Mills said, and will add this line to its expanding motor coach service. The addition of this new route will give the Sioux Falls Traction System a total of 1,726 miles daily on its various intercity motor coach lines operating over six different routes and reaching into four states, South Dakota, Iowa, Nebraska and Minnesota.

**Buses to Be Substituted.**—The Worcester Consolidated Street Railway has decided to abandon its railway between Worcester and Webster, Mass., and will substitute bus service. The New England Transportation Company, bus subsidiary of the New York, New Haven & Hartford Railroad, is expected to furnish the bus service. It is also announced that the Worcester Consolidated would abandon service over its Blackstone Valley line between Worcester and Woonsocket, R. I. In this case also the New England Transportation Company will furnish transportation by bus.

**Must Abandon Bus Service.**—The Key System Transit Company, Oakland, Cal., has applied to the Railroad Commission for permission to abandon its bus service between Los Angeles Avenue and Spruce Street, and Alta Road and Spruce Street in Berkeley. This service was established under a franchise granted by the City Council of Berkeley on Sept. 14, 1926, with the approval of the commission, and it was proposed to operate said service for a period of 180 days to determine if the patronage of the line would warrant its continuance. The company reports that the earnings have averaged $150 a month, while the cost of operation has averaged approximately $1,160 a month.

**Permit Granted.**—The Board of Public Works has granted the St. Louis Bus Company, auxiliary of the United Railways, St. Louis, Mo., a permit to operate buses on Watson Road from Penrod Avenue to the city limits. It has taken under advisement the application of the same company for a permit on South Kingshighway between Delor and Devonshire Avenues.

**Bus Service Suggested**—Abandonment of the electric railway line connecting Springfield and Worcester, Mass., is proposed. Clark V. Wood, the president of the Springfield Street Railway, has petitioned the Transportation Board in Springfield for bus licenses to replace the trolley service. He said the bus line would parallel the present trolley line through Palmer, Brimfield and Southbridge. The electric line would still be run between Springfield and Palmer, but east of Palmer the removal of tracks and wires was deemed probable. This forms part of the New Haven Railroad's rehabilitation program, he said, and would be put in effect as soon as licenses could be obtained.

# Financial and Corporate

## Extension of Public Control at Boston Suggested

First official indication from the Massachusetts Legislature is that the public control period of the Boston Elevated Railway, Boston, Mass., will not be extended 50 years, as the Harriman commission proposed. An extension of 25 years is favored by the committees on metropolitan affairs and on street railways, sitting jointly. There are 30 members on these committees and twenty of them are in favor of the 25 years. Ten members may formally dissent. The discussion of the measure, as now framed, will be before the ways and means committee of the Senate.

A financial reconstruction is proposed by the committees along the lines suggested in the Harriman bill. In this refinancing there would be an annual saving of $1,061,813 in dividends and taxes. It is proposed to issue 4½ per cent 40-year debentures to be exchanged for the 7 and 8 per cent preferred stock; this would save the road $454,050 annually in dividend payments. Dividends on the common stock are to be reduced from the present rate of 6 per cent to a new rate of 5½ per cent. This would result in an additional saving of $119,397 a year. The saving on federal income taxes on the preferred dividend would be $225,920. The state franchise tax, amounting to $262,375 a year, would be saved.

Out of this annual saving the bill applies $250,000 to a sinking fund to extinguish the debentures, $750,000 a year for about three years to pay back what the company owes cities and towns on what they advanced when the company was running behind. After this indebtedness has been paid the $750,000 would be used for rentals and charges on the Governors Square subway and the Lechmere Square, Maverick Square and Huntington Avenue extensions, and it is suggested that this money be applied also to the purchase of the Revere branch of the Eastern Massachusetts Street Railway.

At present the reserve fund of the company is $2,132,495. It is proposed to use this to buy new equipment.

Five trustees are provided for, the same number as in the present board, and they would be elected for two, four, six, eight and ten years respectively at the outset, reappointments to be for a term of ten years.

Financial features are made contingent upon the approval of the Elevated stockholders. Their attitude toward the matter is of course not known, but it was argued some weeks ago that they should not be required to make the sacrifices in income return called for in the original 50-year bill, a measure which has been the subject of comment before in the JOURNAL.

## Lake Shore Electric Sold

The Lake Shore Electric Railway, Cleveland, Ohio, was sold on March 23 to F. W. Coen and associates by the Union Trust Company, Cleveland, acting for E. W. Moore. Recently the company applied to abandon its line between Sandusky and Norfolk because of decreased receipts. A proposal was advanced to supply the residents of this section with a bus service operated by the Lake Shore Motor Coach Company, a subsidiary organized by the railway.

The Lake Shore Electric Railway, with general offices at Sandusky, covers 183 miles of territory operating in 25 cities and towns. It controls the Lorain Street Railroad and the Sandusky, Fremont & Southern Railway. F. W. Coen, one of the new owners of the line and a former official of the railway, has declared his faith in the future of the interurban in the growing freight business and in the decline in automobile competition owing to parking difficulties in the cities.

# $3,027,694 Net for 1926 in Philadelphia

### P. R. T. Gross Revenue, Including Eight Months of Taxicab Operation, Was $57,196,610—$20,285 Transferred to Surplus—Estimated Earnings by 1930 Are $70,000,000

PASSENGER revenue of the Philadelphia Rapid Transit Company, Philadelphia, Pa., for 1926, including subway-elevated, street cars and buses, with eight months of taxicabs, was $57,196,610. Operating expenses and taxes were $44,915,254. As usual there was a deficit on bus operation, through providing needed but unprofitable transportation service in the more sparsely settled areas of the city. This amounted in 1926 to $274,247. Taxicab net income for the eight months ended Dec. 31 was $198,339, being at the rate of approximately $300,000 per annum, thus offsetting the deficit from bus operation. After providing for payments to city sinking fund, rental for Frankford elevated, fixed charges, 7 per cent dividend on preferred stock and 8 per cent dividend on common stock, there remained $20,285 to be transferred to surplus.

In the annual report, issued under date of Feb. 28, the statement is made that the net income of the entire system for 1926 was $3,027,694. This figure was, of course, reached by adding to the net income of the Philadelphia Rapid Transit Company the net earnings of the taxicabs and subtracting the deficit due to bus operations.

During 1926 the company made considerable progress toward its goal of a fully rounded system of co-ordinated transit. It now co-ordinates every phase of Philadelphia's public passenger transportation, operating about 660 miles of surface track, 39 miles of elevated and subway track and 362 buses over a system of routes in Philadelphia which totals 244 miles and also connects Philadelphia with New York, Atlantic City, Baltimore, Washington and intermediate points. As a necessary step in co-ordination P. R. T. entered the field of taxicab operation by the purchase of the Yellow Cab Company, Philadelphia, for $3,000,000. More than 1,100 cabs are now operated,

NCOME ACCOUNTS OF PHILADELPHIA RAPID TRANSIT SYSTEM AS COMPARED BY THE "ELECTRIC RAILWAY JOURNAL"

| | 1926 | 1925 |
|---|---|---|
| Gross passenger earnings | *$57,196,610 | $49,911,702 |
| Other operating revenue | 830,942 | 691,883 |
| Total | $58,027,552 | $50,603,585 |
| Maintenance and depreciation | $9,278,331 | $8,760,903 |
| Power operation | 3,613,393 | 3,738,720 |
| Conducting transportation | 20,566,841 | 16,612,472 |
| General | 8,047,590 | 5,350,881 |
| Taxes, including paving tax | 3,409,097 | 3,070,879 |
| Total | $44,915,254 | $37,533,858 |
| Operating income | $13,112,298 | $13,069,727 |
| Non-operating income | 707,505 | 416,857 |
| Total | $13,819,803 | $13,486,585 |
| Frankford Elevated rental and sinking fund—city contract | 867,610 | 648,119 |
| Total | $12,952,193 | $12,838,466 |
| Fixed charges, dividends, etc | $12,931,918 | $12,525,459 |
| Surplus | $20,285 | $313,006 |

STATEMENT OF CAPITALIZATION AND INDEBTEDNESS OF THE PHILADELPHIA RAPID TRANSIT COMPANY AS OF DEC. 31, 1926

| Capital Stock | Paid In | Unpaid | Total |
|---|---|---|---|
| Common | $29,996,235 | $3,765 | $30,000,000 |
| 7% cumulative preferred | 13,982,600 | 4,017,400 | 18,000,000 |
| Total | $43,978,835 | $4,021,165 | $48,000,000 |
| Funded Debt: | | | |
| Collateral trust 5 per cent bonds due 1957 | | | $4,108,000 |
| Sinking fund 5 per cent gold bonds due 1962 | | | 576,000 |
| Sinking fund 6 per cent gold bonds due 1962 | | | 8,933,000 |
| Equipment trust series "D" 1919-1929 | | | 27,000 |
| Equipment trust series "E" 1919-1929 | | | 87,000 |
| Equipment trust series "F" 1922-1932 | | | 1,800,000 |
| Equipment trust series "G" 1923-1933 | | | 3,325,000 |
| Equipment trust series "H" 1924-1934 | | | 2,160,000 |
| Equipment trust series "J" 1926-1936 | | | 1,700,000 |
| Real estate mortgage | | | 150,000 |
| Total | | | $22,866,000 |

*Figures for 1926 include taxicab earnings for eight months while those for 1925 are based solely on electric railway and bus earnings.

STATEMENT OF WAGE TREND IN PHILADELPHIA

| Calendar Year | Maximum Hourly Wage, Cents | Passengers Carried per Trainman | Calendar Year | Maximum Hourly Wage, Cents | Passengers Carried per Trainman |
|---|---|---|---|---|---|
| 1911 | 23½ | 72,405 | 1919 | 58 | 137,785 |
| 1912 | 25 | 77,561 | 1920 | 72½ | 150,785 |
| 1913 | 30 | 85,762 | 1921 | 65 | 137,432 |
| 1914 | 30 | 89,790 | 1922 | 69 | 141,528 |
| 1915 | 30 | 96,106 | 1923 | 70½ | 146,658 |
| 1916 | 32 | 107,800 | 1924 | 71½ | 148,264 |
| 1917 | 35 | 113,940 | 1925 | 77 | 148,632 |
| 1918 | 48 | 120,102 | 1926 | 77 | 151,173 |

this co-ordination tending to protect the system against the inroads of competitive operation and consequent diversion of earnings to which electric railways are now being increasingly subjected. It was stated that the absorption of all taxicabs in the city, when effected, will work toward the elimination of cruising and a corresponding lessening of vehicular congestion in the streets.

Nine new bus routes, operating 127 miles, had been established during 1925. The system was further added to in 1926 by the installation of nine additional routes, operating 101 miles over city streets—a net addition of 32 per cent to P. R. T.'s route mileage accomplished within two years. In assuming the burden of the deficit incident to its bus operation the company has had in view the necessity of establishing a more complete transportation service to newly developed outlying areas, where population is not sufficient to warrant the expense of car tracks and where rubber-tired vehicles—with a seat for a fare—are necessary to supply a type of transportation more nearly comparable to the private automobile.

The company estimates that the system's earnings should reach $70,000,000 by 1930, of which 25 per cent may be earned by taxicabs and buses. If bus and cab service had not been developed by P. R. T., it is believed that 1930 would find the company with earnings entirely insufficient to enable it to supply adequate city-wide transit without endangering its own present financial position.

During this present year the company has purchased 218 new gas-electric buses. In 1926 P. R. T. purchased 50 new surface cars and 135 gas-electric buses. More than $2,000,000 was expended in constructing and equipping track extensions to the Sesqui-Centennial grounds. This was done with the twofold purpose in view of serving the exposition and of pushing forward the development of the too-backward southern section of the city. While the actual number of passengers carried to and from the Sesqui was only about 15 per cent of those for which provision was made, the immediate losses sustained by the company in this respect are not regarded as of a permanent character, but rather as an investment made in advance of the immediate needs of the section served.

The company extended itself during 1926 to meet the views of the city. The bankrupt Frankford, Tacony & Holmesburg Street Railway was taken over to supply increased feeder service to the Frankford "L." A single fare from the city center, by means of a free transfer with the "L," was extended northerly to Rhawn Street and a bus service with 10-cent fare and 3-cent exchange ticket was started to serve the sections from which the non-paying car lines were removed.

At the urgent request of the city the company agreed to increase its rental for the Frankford elevated from $780,200 to $936,850 per annum. The city desired that this be done in order that its borrowing capacity might be released to the extent of some $14,000,000, to accomplish which it was then necessary that the lease be extended to 1957. It was determined by the Public Service Commission to withhold its approval of this lease extension until the completion of its investigation now being conducted into P. R. T. matters. This decision was approved by the company.

Included in the report is a restatement of the three basic principles of Mitten Management, namely:

*To the Public:* To furnish an adequate system of transportation, operated efficiently and courteously; to improve service to the fullest extent that improvement can be supported by the fare collected, and to offer the fullest opportunity to the car rider to share in the ownership of the property.

*To the Employees:* To pay wages adequate to the necessities of life and comfort, and sufficient to permit of reasonable savings. To provide opportunity for participation in increased earnings made possible by the increased effort of the employees, and to encourage the investment of this added compensation in such a way as to make the employees owners as well as workers.

*To the Owners:* To pay a reasonable return on the actual value of P. R. T. property, in justice to those who make P. R. T. possible, and to keep the credit of P. R. T. at a point necessary to support a high standard of public service.

Then follows a summary of accomplishments which have been made under these three heads during the sixteen years in which Mitten Management has been in charge of transportation matters in Philadelphia. These results are set forth in the comparisons shown in the following:

STATEMENT OF INCREASED RIDING IN PHILADELPHIA

| Calendar Year | Revenue and Transfer Passengers | Rides per Capita |
|---|---|---|
| 1911 | 517,697,478 | 329 |
| 1912 | 549,674,683 | 343 |
| 1913 | 580,011,057 | 357 |
| 1914 | 581,297,949 | 352 |
| 1915 | 594,220,409 | 354 |
| 1916 | 669,008,258 | 392 |
| 1917 | 726,936,340 | 419 |
| 1918 | 763,008,395 | 432 |
| 1919 | 866,944,336 | 483 |
| 1920 | 908,482,135 | 501 |
| 1921 | 836,547,351 | 451 |
| 1922 | 848,883,512 | 450 |
| 1923 | 918,775,871 | 480 |
| 1924 | 913,855,751 | 469 |
| 1925 | 926,928,994 | 468 |
| 1926 | 966,469,223 | 480 |

The P. R. T. report for 1926 is concluded with a reprint of an article on the "Underlying Companies of the City Transit System," by Edmund Stirling, a local newspaper authority on transit matters, which appeared in the *Public Ledger*. There has been much agitation in Philadelphia to eliminate the "underliers" and with them the heavy rentals which P. R. T. must pay each year. Whether this latter step could be accomplished without heavy payments which would wipe out any savings is frankly questioned, but, at any rate, P. R. T. officials, city authorities and the general public are all agreed that some step should be taken to place the original franchises and charters, now controlled by the underliers, under a unified ownership. To dispel the false notion that confiscation proceedings could be instituted against the underlying companies, P. R. T. has quoted Mr. Stirling, in part, as follows:

The fairness and equity of these rentals are not here an issue. It is well known that the grant of the charters was in many instances clouded by corruption and the execution of the leases was attended by the infusion of a vast amount of water. Some of the contracts were deliberately made to escape tax and other legal obligations of the companies. But these maneuvers were all carried through under the forms of law, and the validity of the contracts and leases has been repeatedly confirmed by legislative action.

INCREASED RETURNS TO STOCKHOLDERS OF THE PHILADELPHIA RAPID TRANSIT COMPANY

| Calendar Year | P.R.T. Surplus | Dividends on P. R. T. Stock Preferred Per Cent | Common Per Cent |
|---|---|---|---|
| 1911 | $358,250 | ..... | ..... |
| 1912 | 260,236 | ..... | ..... |
| 1913 | 676,849 | ..... | ..... |
| 1914 | 930,564 | ..... | ..... |
| 1915 | 1,128,017 | ..... | ..... |
| 1916 | 2,987,975 | ..... | $1,348 656–4½ |
| 1917 | 4,345,900 | ..... | 1,499,277–5 |
| 1918 | 4,482,119 | ..... | 1,499,290–5 |
| 1919 | 4,482,532 | ..... | 1,499,290–5 |
| 1920 | 4,195,356 | ..... | ..... |
| 1921 | 5,748,980 | ..... | ..... |
| 1922 | 5,640,664 | ..... | 1,799,148–6 |
| 1923 | 5,616,833 | ..... | 1,799,148–6 |
| 1924 | 5,652,582 | ..... | 1,799,575–6 |
| 1925 | 6,178,916 | $60,871–7 | 2,399,639–8 |
| 1926 | 6,489,188 | 607,766–7 | 2,399,644–8 |

Had their legal status been assailed at the time, something might have been accomplished toward lifting the burden of excessive fixed charges from the car riders. But while the crookedness of transit policies and the selfishness of the financing methods of the street railway owners were notorious, the people went on electing officials who gave these transactions a binding force.

Furthermore, the persons who profited by the juggling of street-railway leases and finances have long since disappeared from the stage. Their holdings were unloaded upon the public, until today it is doubtful whether any of the stocks and bonds of the underliers are held by the descendants of original purchasers. Bought as safe investments, under repeated guarantees, the greater part of them are to be found in trust estates. It is inconceivable that any court today would permit their condemnation at less than their present-day, fair market value. And if the effort to cancel the original charters were to be made, under the state's constitutional right to alter, revoke or annul charters of incorporation, that power and right are definitely limited by the same fundamental law, so that it can only be exercised in such a way that "no injustice shall be done to the corporators."

Few will question the desirability of getting rid of the traction underliers. But only those agents of a selfish propaganda which is designed to confuse the public mind about the real facts of the case have dared suggest this can be accomplished by other than legal means and without doing justice to innocent investors.

**Takes Over Another Line.** — The United Railways & Electric Company, Baltimore, Md., will take over the Lorraine Cemetery car line on April 1 and improve the service. This line has been operated by the Lorraine Cemetery Company for some time.

## New Members Elected to Eastern Massachusetts Board

At the annual meeting of the stockholders of the Eastern Massachusetts Street Railway, Boston, Mass., recently held, the following directors were elected:

Charles Hayden, Lester Watson, Roger Amory, Franklin T. Miller, Albert A. Harrison, Robert B. Stearns, Henry G. Lapham, A. W. Pinkham, L. Sherman Adams and Cornelius J. Corcoran. Only three of the former directors are carried in the new board. They are L. Sherman Adams, Roger Amory and Franklin T. Miller.

Charles Hayden and Lester Watson are members of the firm of Hayden, Stone & Company, which acquired a substantial financial interest in the company after the so-called Adams suit.

## Balance in Detroit Shows Increase

The operating revenue of the Department of Street Railways at Detroit, Mich., for the year ended Feb. 28, 1927, was $24,651,578 against $23,756,099 for the year previous. These figures included a railway operating revenue of $22,213,412 and a coach operating revenue of $2,438,166 in 1927 against $22,734,840 and $1,021,058 for a railway and coach revenue respectively in 1926. Total operating expenses increased from $17,934,835 to $19,070,140 in 1927. The railway operating expenses decreased from $16,938,688 in 1926 and $16,788,206 for the year ended Feb. 28, 1927. Coach operating expenses increased from $996,147 for the year ended Feb. 28, 1926, to $2,281,933 for the year ended Feb. 28, 1927. Net revenue was $5,858,149 against $6,019,663 in 1926. Net income fell from $3,357,854 to $3,187,287 for the current year. The balance was $587,060 for the year ended Feb. 28, 1927, and $571,810 for the year ended Feb. 28, 1926. Total railway passengers numbered 476,716,753 in 1927 and 488,589,883 in 1926. Total coach passengers numbered 13,611,347 in the 1926 period to 30,714,819 in 1927.

## Loss in Alliance in 1926

Abandoning buses, scrapping the machines which were practically worthless and disposing of antique equipment during 1926 increased overhead expenses for the Stark Electric Railroad, Alliance, Ohio, to $153,851 and resulted in a net loss for the year of $80,141. The financial summary as made public was as follows:

| | 1926 | 1925 |
|---|---|---|
| Gross earnings | $460,865 | $467,223 |
| Operating expenses | 387,155 | 361,474 |
| Operating revenue | 73,709 | 105,748 |
| Taxes and fixed charges | 153,851 | 113,631 |
| Net Loss | $80,141 | $7,882 |

From this summary it is seen that gross earnings in 1926 were nearly $7,000 less than 1925. Operating expenses last year were about $26,000 greater than 1925 and fixed charges about $40,200 greater.

Last year the Stark Electric Railroad, with about 30 miles of track, in addition to the city bus routes in Alliance was patronized by 2,845,996 persons, compared with 2,871,730 persons during 1925. Last year this number was divided, 1,897,101 being carried on interurban cars and 948,895 being carried on city cars. In 1925 interurban patrons were 1,965,228 and city patrons 906,502.

During the greater part of 1925, when the larger number of passengers were transported, street cars were operated in Alliance on a regular schedule over about 2 miles of city lines. During the latter part of 1925 and the majority of 1926 buses were used.

For 1927 the outlook is very good for a small loss or a possible profit. This is due mainly to steps taken by the company during the last few months. Discarding buses, which proved a loss instead of a gain, and returning to street cars is believed to be a big step in reducing the operating cost due to the large expenses in maintaining buses. At the same time the company abandoned a number of old cars.

Although it serves two cities and one fair-sized town, the Stark Electric operates city cars only in Alliance. Interurban service is run between Canton and Salem, in addition to the city cars in Alliance.

**New Directors at Louisville.**—At the annual meeting of the stockholders of the Louisville Railway, Louisville, Ky., Ralph C. Gifford, vice-president of the First National Bank, and William C. Campbell, manager and chief engineer of the Kentucky & Indiana Terminal Railroad, were elected directors. S. T. Culver, an interurban motorman, became employee representative on the board, to replace J. J. Blackerby.

**Net Income Increases.**—For the eight months period ended on Feb. 28, 1927, the total operating revenues of the Brooklyn-Manhattan Transit System, Brooklyn, N. Y., was $30,714,101, against $29,522,318 for a similar period of the previous year. Total operating expenses increased from $19,249,877 to $19,829,161 for the eight months period ended Feb. 28, 1927. After a consideration of income deductions a net income remained of $4,137,106 for the eight months ending Feb. 28 of the current year, against $3,648,345 in 1926.

**Line Will Be Abandoned.**—General Manager John McIntosh announced recently that in consequence of an annual operating deficit of $30,000, the Chicago & Interurban Traction Company operating from 63d and Halsted Streets, Chicago, to Kankakee, Ill., will be discontinued before April 30. Failure of the line to pay, he said, was in part due to automobile competition and in part to being forced to pay the same high wage scale as that received by employees of Chicago surface lines. Coincident with the announcement was the granting by the Illinois Commerce Commission to the Schappi Bus Lines, Inc., an Insull company, of a certificate permitting it to operate between Chicago Heights, Halsted and 63d Streets.

**Abandonment of Asbury Park Belt Line Authorized.**—Abandonment of the inside belt line, operated by the Coast Cities Railway in Asbury Park, N. J., has been sanctioned by the Board of Public Utility Commissioners. Suspension of the service and surrender of charter has already been approved by a municipal ordinance. Evidence indicated the line is not well patronized and is operated at a heavy deficit.

## Conspectus of Indexes for March, 1927

Compiled for Publication in This Paper by
**ALBERT S. RICHEY**
Electric Railway Engineer, Worcester, Mass.

| | Latest | Month Ago | Year Ago | Since War High | Since War Low |
|---|---|---|---|---|---|
| **Street Railway** Fares* 1913 = 4.84 | Mar. 1927 **7.43** | Feb. 1927 **7.45** | Mar. 1926 **7.36** | Feb. 1927 **7.45** | May 1923 **6.88** |
| **Electric Railway** Materials* 1913 = 100 | Mar. 1927 **152.1** | Feb. 1927 **154.0** | Mar. 1926 **156.4** | Sept. 1920 **247.5** | Oct. 1924 **148.5** |
| **Electric Railway** Wages* 1913 = 100 | Mar. 1927 **226.7** | Feb. 1927 **226.7** | Mar. 1926 **224.1** | Sept. 1920 **232** | Mar. 1923 **206.8** |
| **Am. Elec. Ry. Assn.** Construction Cost (Elec. Ry.) 1913 = 100 | Mar. 1927 **203.0** | Feb. 1927 **202.9** | Mar. 1926 **202.0** | July 1920 **256.4** | May 1922 **167.4** |
| **Eng. News-Record** Construction Cost (General) 1913 = 100 | Mar. 1927 **208.8** | Feb. 1927 **210.2** | Mar. 1926 **207.6** | June 1920 **273.8** | Mar. 1922 **162.0** |
| **U. S. Bur. Lab. Stat.** Wholesale Commodities 1913 = 100 | Feb 1927 **146.4** | Jan. 1927 **146.9** | Feb. 1926 **155.0** | May 1920 **246.7** | Jan. 1922 **138.3** |
| **Bradstreet** Wholesale Commodities 1913 = 9.21 | Mar. 1 1927 **12.55** | Feb. 1 1927 **12.52** | Mar 1 1926 **13.40** | Feb. 1 1920 **20.87** | June 1 1921 **10.62** |
| **U. S. Bur. Lab. Stat.** Retail Food 1913 = 100 | Feb. 1927 **156.0** | Jan 1927 **159.3** | Feb. 1926 **161.5** | July 1920 **219.2** | Mar. 1922 **138.7** |
| **Nat. Ind. Conf. Bd.** Cost of Living 1914 = 100 | Feb. 1927 **165.2** | Jan. 1927 **166.9** | Feb. 1926 **169.5** | July 1920 **204.5** | Aug. 1922 **154.5** |
| **Steel Unfilled Orders** (Million Tons) 1913 = 5.91 | Feb. 28 1927 **3.597** | Jan. 31 1927 **3.800** | Feb. 28 1926 **4.617** | July 31 1920 **11.118** | July 31 1924 **3.187** |
| **Bank Clearings** Outside N. Y. City (Billions) | Feb 1927 **16.72** | Jan. 1927 **18.89** | Feb. 1926 **16.73** | Oct. 1925 **20.47** | Feb 1922 **10.65** |
| **Business Failures** Number | Feb. 1927 **1859** | Jan. 1927 **2227** | Feb. 1926 **1669** | Jan. 1924 **2211** | Aug. 1925 **1353** |
| Liabilities (Millions) | **65.42** | **75.06** | **60.98** | **122.95** | **27.22** |

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 137 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

# Personal Items

## Changes Among Chicago Division Superintendents

Three important changes in the transportation department of the Chicago Surface Lines have been announced by the management. Michael Harrington, who has been in the service since 1884, resigned his position as division superintendent at the Kedzie depot, division No. 7, and took a furlough from the service. R. J. McKinney, division superintendent at Elston depot, division No. 10, was transferred to Kedzie in Mr. Harrington's place, and Walter M. Kroll, assistant superintendent of the tenth district, succeeds Mr. McKinney as superintendent in that district. E. E. Victorson, connected with the downtown supervisory force, was made assistant division superintendent to succeed Mr. Kroll.

Mr. Harrington entered the service as a horse car driver and became a motorman after the electrification of the lines. He was appointed supervisor in 1901 and made foreman at Kedzie depot in 1903. He became division superintendent at Kedzie in 1914 and was sent to the general office as assistant superintendent of transportation in 1923, returning to Kedzie as division superintendent two years later.

Mr. Kroll entered the Surface Lines service as a motorman in 1894 and has been foreman at the Elston depot, assistant superintendent, assistant superintendent of train service employment and division superintendent.

Mr. Victorson entered the service with the track department in 1905 and was transferred to the train service as a conductor in 1910. He served in the army during the World War and upon his return was employed by the Elgin, Joliet & Eastern Railway, re-entering the Chicago Surface Lines service three years later as a starter at the Kedzie depot.

## Deane Ackers Local Manager at Topeka

To fill a newly created position Deane Ackers, formerly local manager of the Kansas Power & Light Company's properties at Atchison, has been made local manager of the company's properties in Topeka, it has been announced by A. M. Patten, vice-president and general manager of the company.

Starting in 1924 with the Illinois Power & Light Company, the parent company, Mr. Ackers was made local manager at Atchison, to succeed C. A. Leland, Jr., who had been transferred to Topeka.

A graduate of the school of engineering at the University of Kansas in 1917, Mr. Ackers attended the first officers' training camp and was commissioned a second lieutenant in the infantry in August, 1917. Later he was promoted to the rank of first lieutenant and finally to the grade of captain. He served with the Sixteenth Infantry of the First Division.

After two years overseas, taking part in all engagements with the First Division Mr. Ackers returned to the United States in 1919. He joined the United Power & Light Corporation and had headquarters at Abilene with the position of construction engineer. He was there until 1924, when he joined the Kansas Power & Light Company.

## Dr. A. A. Mitten Will Carry On Industrial Democracy

Dr. A. A. Mitten, whose succession to the chairmanship of the executive committee of the Philadelphia Rapid Transit Company, Philadelphia, Pa., was referred to in the ELECTRIC RAILWAY JOURNAL, issue of March 19, page 548, has been the silent influence and power in the company's co-operative welfare and public relations work. He

A. A. Mitten

is as much at ease with a track employee as with an official and is eminently qualified to maintain contacts between men and management. His activity with the company began on May 1, 1919, when he became secretary of the Co-operative Welfare Association. Ever since that time he has taken an active part in the co-operative activities of the company and is personally known and highly regarded by thousands of the company's employees. At the same time Dr. Mitten became secretary of the employees' Co-operative Association he also assumed the duties of supervisor of welfare and employment.

T. E. Mitten's only son was educated as a physician and surgeon. He entered the electric railway industry in 1915 as industrial surgeon with the company in Milwaukee. When the United States entered the World War Dr. Mitten went to France as a captain of an ambulance company, was twice severely gassed, was wounded and then captured in August, 1918. He was imprisoned at Villingen until after the armistice was signed.

On May 15, 1922, Dr. Mitten was elected a director of the company and he has served in that capacity without interruption since that time. Until his election as chairman of the executive committee he acted as secretary of the board of directors. Dr. Mitten has also served for several years as vice-president of Mitten Management, Inc., which operates both the Philadelphia Rapid Transit Company and the International Railway, Buffalo, N. Y.

Now the time has come around when T. E. Mitten sees fit to relinquish some of the overwhelming mass of details which constantly spring into being on a property the size of the Philadelphia one. For sixteen years Mr. Mitten has served as chairman of the executive committee. Now his son has stepped into this position. The father will continue as chairman of the board of directors of the company.

At the annual meeting of the stockholders at which Mr. Mitten relinquished his post to his son other officers, in the main, were re-elected. C. J. Kelley replaced W. D. Witt as auditor of the company. Coleman J. Joyce and Leon Jewell were replaced on the board of directors by J. A. Queeney and Ralph T. Senter respectively. However, both will continue their services with the company. As a matter of fact, no particular significance attaches to the absence this year of the names of Mr. Joyce and Mr. Jewell from the board of directors. It is a policy of the management to assign men to meet the exigencies of the particular situation at hand. When an expert on rates and valuation was needed on the P. R. T. board, Mr. Joyce was the logical man to fill the post. This year the Philadelphia problems will chiefly be matters of operation, while in Buffalo the questions of valuation and rate-fixing were never more pressing than at this time.

## Andrew Marshall Resigns as Boston Elevated Trustee

Andrew Marshall has resigned as a member of the board of public trustees of the Boston Elevated Railway, Boston, Mass. He was appointed by Governor Fuller on Aug. 26, 1925, to succeed former chairman James F. Jackson, and it was the Governor's intention that he should serve as chairman of the board.

Mr. Marshall opposed the original proposition for the reorganization of the company because of the sacrifice which he felt would be imposed on the stockholders to obtain a 50-year extension of the public control law. He argued the case exhaustively before the legislative committee, and the 25-year control plan which finally came out of the committee is a little closer to what he urged, but it is not his plan and he has not expressed himself regarding it.

Mr. Marshall was not elected chairman of the board, as that designation was given to Samuel L. Powers by the other trustees, who contended that they, and not the Governor, had the power of electing a chairman.

In his letter of resignation to the Governor Mr. Marshall explained that the demands of his law practice, consisting in part of the trial of cases which occasionally are of extended length, are such that it is difficult to

meet these demands and at the same time to perform the duties of the public trusteeship in a manner which he considered adequate.

It is understood that no successor to Mr. Marshall will be appointed by Governor Fuller until the Legislature has acted upon the pending plans for the reorganization of the Elevated.

## S. B. Irelan Transferred to Kansas City

S. B. Irelan, vice-president and general manager of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., for the past four years, has been appointed Western manager of the securities department of the Henry L. Doherty interests, with headquarters in Kansas City.

In the course of his career he has been identified in an executive capacity with Doherty properties in almost every section of the country. From Denver he went to Fremont, Nev., and thence to New York to the engineering and statistical department, where he engaged in special work of revising the classification of accounts and report system. In 1914 he became vice-president and general manager of the Bartlesville (Okla.) utilities, but two years later he was transferred to Sedalia, Mo., in a similar capacity. From 1917 to 1923 Mr. Irelan was connected with the companies at Montgomery, Ala., which in the latter year were sold to the Alabama Power Company. It was at this time that he removed to St. Joseph as vice-president and general manager.

As manager of the securities department of the Western division, he will have charge of all the territory west of the Mississippi River.

**Francis X. Sullivan** was appointed to the Board of Transportation, New York, N. Y., by Mayor Walker, on March 23. The new incumbent succeeds William A. De Ford, a holdover from the Hylan administration, who resigned last November. Commissioner Sullivan has been prominent for many years as an attorney for labor unions and at present is counsel for the State Federation of Labor. He was graduated from Union College in 1901. From 1917 to 1921 he was Commissioner of Public Works in Queens. For two years he served as a member of the Home Rule Commission of New York.

**T. H. Steffens**, vice-president of the Sand Springs Railway, Sand Springs, Okla., for the past fifteen years, has succeeded the late Charles Page as president. Mr. Steffens has been with this property since its organization. Prior to that time he was connected with the St. Louis-San Francisco Railroad, St. Louis, Mo.

**Ralph H. Love**, manager of the Hiawatha, Kan., properties of the Illinois Power & Light Corporation, has been appointed local manager of the Kansas Power & Light Company's property at Atchison, Kan., to succeed Deane Atkins, transferred to Topeka. Mr. Love will continue in charge of the Hiawatha plant.

## Changes Announced in New Jersey Property

Changes in personnel of the Public Service Railway and the Public Service Transportation Company, Newark, N. J., were announced recently by Arthur T. Warner, general manager in charge of traffic. They are: Morton H. Dean, formerly superintendent of time-tables, as traffic engineer; Herbert E. Conway, formerly traffic investigator,

M. H. Dean

as superintendent of time-tables; Harold B. Whitman, formerly assistant manager, Passaic Division, as passenger agent.

Morton H. Dean, the new traffic engineer, began work for the Public Service in 1906 in the time-table department at Newark. Later he became a schedule maker and then chief clerk in that department. In 1925 he was appointed superintendent of time-tables.

Herbert E. Conway, who has replaced Mr. Dean as superintendent of time-tables, entered the Public Service Railway employ in 1910, upon leaving Stevens Preparatory School. He took a position in the time-table department and three years later was transferred

H. E. Conway

to the traffic department as traffic investigator. In 1917 he returned to the time-table department as schedule maker and became chief clerk of that department in 1925.

Harold B. Whitman, passenger agent, became a checker in the traffic department after returning from the Mexican border in 1917. He served as sergeant in the Argonne during the World War and returned to Public Service in 1922, becoming superintendent of the Market Street carhouse in Paterson. He was appointed assistant manager railway and transportation, Passaic Division, Nov. 1, 1925, and recently has been attached to the traffic department in Newark.

**Frank T. Freeman**, who for the past two years has been superintendent of bus maintenance and repairs of the Public Service Transportation Company, subsidiary of the Public Service Railway, Newark, N. J., resigned on Feb. 25. At one time he was in the garage business in Florida and later he built and equipped a modern plant at Rahway for general machine, foundry and electrical contracting and automobile repair work. For many years Mr. Freeman has been identified with the maintenance of automotive fleets, having previously worked in that capacity with the Standard Oil Company of New Jersey and Kaufman's Department Store, Inc., Pittsburgh, Pa. Mr. Freeman has not announced any plans for the future.

# Obituary

## Wallace Heckman

Wallace Heckman, a vice-president of the Chicago Railways and former business manager and general counsel for the University of Chicago, died in Chicago on March 7. As a member of the operating board of the Chicago Surface Lines Mr. Heckman served as an arbitrator in several labor controversies involving the railways.

Mr. Heckman was born at Moscow Mills, Ohio, May 2, 1851. He was admitted to the Illinois bar in June, 1876, and from 1885 to 1908 was senior member of the law firm of Heckman, Elsdon & Shaw. In 1903 he was made counsel and business manager of Chicago University, which position he held until 1924, when he became associated with the Chicago Surface Lines.

**Oren Joseph Smith**, at one time chief engineer of the Denver Tramway, Denver, Col., died recently in Denver. He was 74 years old.

**Joseph J. Heim**, financier of Kansas City, Mo., and at one time an important figure in transportation, died in Kansas City recently after a year's illness. Mr. Heim's specialty was railway construction. With J. W. Ground, T. K. Irwin, W. W. Calhoun and Fred Fitch he constructed the Joplin & Pittsburg Railway, of which he later became president. Some ten years ago he was the principal owner in the Kansas City, Kaw Valley & Western Railway, which he also built. More than 30 years ago Mr. Heim built the East Side Railway of Kansas City at his own expense. The road extended from the north side business district of Kansas City to the East Bottoms district. An amusement park served by the railway was erected shortly afterward near the Heim Brewery.

# Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

## Dr. Gilbreth Urges Psychological Test for Workers

Stressing the need for more attention to the psychological aspects of the worker when building an effective industrial organization, Dr. Lillian Gilbreth, of Gilbreth, Inc., consulting engineer, New York City, made the principal address before the New York Railroad Club in the Engineering Societies Building on March 18. Mrs. Gilbreth is one of the three women members of the American Society of Mechanical Engineers.

In the opinion of the speaker, the first step necessary in building an effective organization is to inculcate a healthy philosophy toward work. The worker is pessimistic, especially when production is being pushed. He has an undeveloped economic theory. He must know whether or not he is going to suffer if he increases production. From the standpoint of the speaker, motion-study, stop-watch analyses are not half so effective as a deep study of the psychological effects caused by the pressure of work, worry, friction, fatigue, financial troubles, isolation, and lack of appreciation. Dr. Gilbreth also pointed out that a man might display ability for a certain job, yet not like the job, because it had no emotional appeal for him.

It is highly important to determine whether the nervous stability of the worker is of the kind that would make him benefit by the work he is engaged in. After such studies are made, and the man selected on the basis of these psychological facts, then the workers must interlock in so far as their jobs are concerned. In other words the worker must be teaching the man below him, while he is learning the job up ahead of him. Dr. Gilbreth laid great emphasis on the necessity of making a study of machines before planning better methods. In her opinion, the betterment of machine design has never been given the attention it deserves.

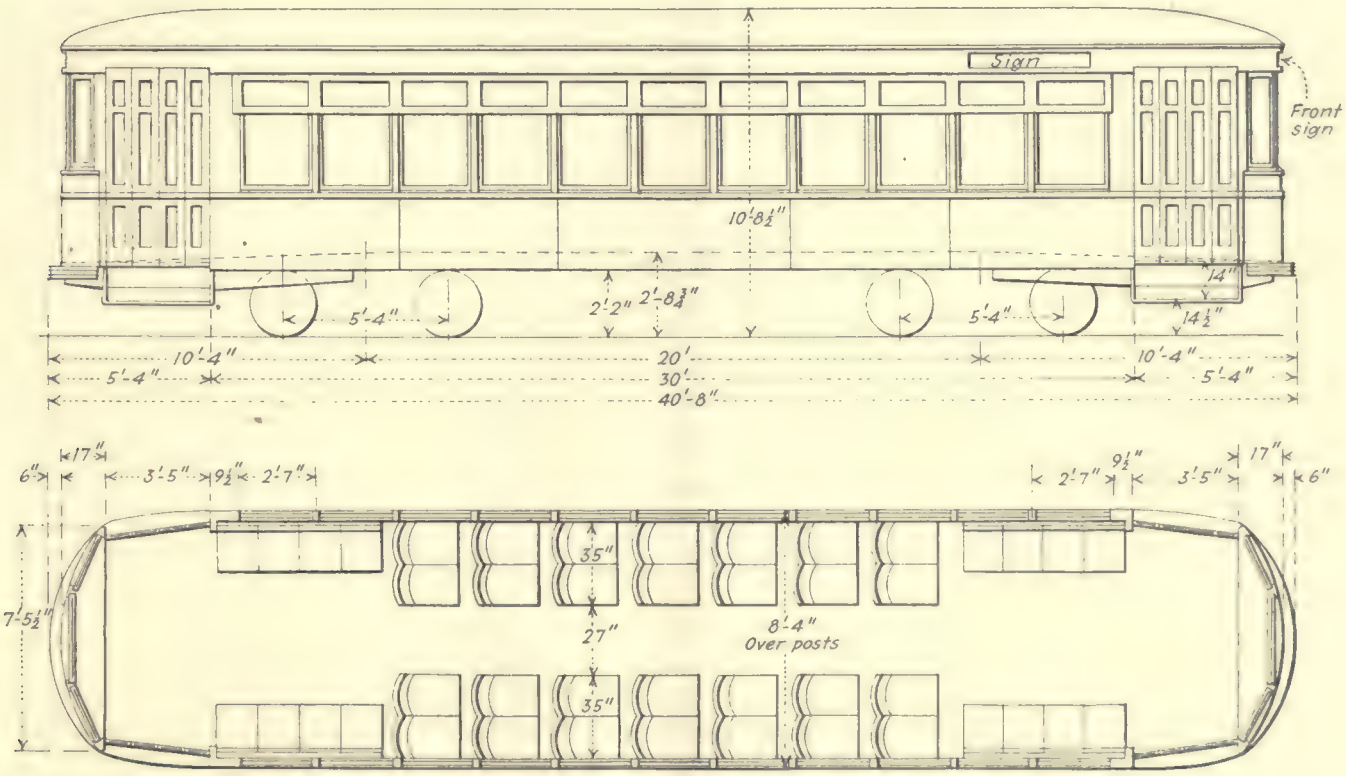
The psychological test to be absolutely effective and practical must begin at the top, said the speaker. It must be good for everybody, and records of each test are essential. In illustrating the point that rapidity of motion and nervous energy often resulted in lost motion, Dr. Gilbreth cited the case of the lazy man who, he said, often makes good by reason of his laziness.

# Springfield-Worcester Car Order Placed

### Total Cost of 100 New Vehicles Will Be $1,650,000—50 Cars to Be Built by Osgood-Bradley and 50 by Wason —Delivery Promised July 1

PROMISES made by the New York, New Haven & Hartford Railroad to improve the facilities of its street railway subsidiaries in Springfield and Worcester, Mass., culminated on March 22 in the placing of orders for 100 cars costing $1,650,000. As forecast in the JOURNAL of March 14, contracts for 50 cars for the Worcester Consolidated Street Railway were awarded to the Osgood-Bradley Car Company and 50 for the Springfield Street Railway to the Wason Manufacturing Company. They will be of the double-truck, light-weight, one-man, city type, semi-steel construction.

Aside from the accompanying specifications, general specifications issued by the two companies call for four longitudinal seats and fourteen cross-seats of the deep cushion type with welts on the cushions to give individual seat effect. The backs of the cross seats are to be concave and scalloped to give individual seat effect. Panels under longitudinal seats are to be of aluminum. The railway company is to have the option of genuine leather or best quality Chase mohair upholstery. Rico rigid retrieving sanitary car straps are to be provided over each longitudinal seat. The wainscot of




Exterior and floor plan of new Worcester-Springfield cars

the car from the top of the seat support panels to the window sills is to be ¼-in. mahogany-faced three-ply Haskelite.

All movable windows are to have Rex brass removable sash. Root, Wason or Bradley air-operated scrapers will be installed at the option of the companies. Specifications with respect to the trucks call for the car body to be mounted on low-level trucks to be selected by the railway company, the trucks to have solid forged side frames and cast-steel bolsters. The proposals of the car companies must contain estimates for both plain and roller bearings. Brakeshoes are specified as A. B. S. & F. Co. Diamond "S," pattern D-67. Safety car devices are to be manufactured by the Safety Car Devices Company. The floor is to be covered with 3/16-in. battleship linoleum. Automatic window wipers are to be supplied in the center front vestibule window.

Each car is to be equipped with double-faced advertising sign racks to carry public notice cards attached to car lines and extending across the center of the inside car body. An outside color scheme of yellow, cream, and red for lettering, has been specified. All mahogany interior finish is to be stained mahogany. Weights of the cars have not yet been announced.

General specifications are as follows:

| | |
|---|---|
| Number of cars ordered | 50 each |
| Date order was placed | March 22, 1926 |
| Builder of car body | Osgood-Bradley Car Co., Wason Manufacturing Co. |
| Type of car | Double truck, city type, light Weight, one-man, two-man |
| Seating capacity | 44 |
| Bolster centers, length | 20 ft. 0 in. |
| Length over all | 40 ft. 8 in. |
| Truck wheelbase | 5 ft. 4 in. |
| Width over all | 8 ft. 4 in. |
| Height, rail to trolley base | 10 ft. 10¾ in. |
| Body | Semi-steel |
| Interior trim | Mahogany |
| Headlining | 3/16-in. Agasote |
| Roof | Arch |
| Air brakes | General Electric Co. or Westinghouse Elec. & Mfg. Co. |
| Axles | A.S.T.M. spec. annealed carbon steel |
| Bumpers | 7-in. Hedley anti-climber |
| Car signal system | Faraday |
| Car trimmings | Bronze |
| Curtain fixtures | Curtain Supply Co. |
| Curtain material | Brown denim |
| Designation signs | Hunter |
| Door mechanism | National Pneumatic Co. |
| Energy-saving device | Arthur |
| Fare boxes | Cleveland Model 5 |
| Hand brakes | Peacock staffless |
| Heater equipment | Railway Utility |
| Headlights | Golden Glow or General Electric |
| Motors | Four 35-hp. General Electric or Westinghouse |
| Paint | Vitralite |
| Seats | Brill, Heywood-Wakefield or Hale-Kilburn—optional |
| Step treads | Kass Safety |
| Trolley catchers | Ohio Brass |
| Trolley base | Nuttall No. 20 or Ohio Brass |
| Ventilators | Garland, Railway Utility or Nichols-Lintern |
| Wheels | A.E.R.A. standard 26 in. |

## $7,000,000 Additional Insurance Carried by G. E. Employees

More than $132,000,000 in life insurance was carried by employees of the General Electric Company under the free and additional group plans on Dec. 31, 1926. During the first two weeks of 1927 a recanvass of employees resulted in securing 5,000 additional names for a total of about $7,000,000 insurance, increasing the number of all employees of the company insured to 83 per cent of those eligible.

Since the additional insurance has been in force, 340 employees have died. They had free insurance to the amount of $390,825, and 255 held additional insurance totaling $354,500, making a grand total of $745,325.

Approximately 64,000 employees were insured under the free insurance plan, and 46,300 employees under the additional group policy. The average policy under the free insurance was $1,108 and the average under the additional plan was $1,331, making an average of $2,439 per employee for the 46,300 in the additional group.

## A.E.R.A. Exhibit Blanks Will Be Mailed In May

Fred C. J. Dell, director of exhibits, American Electric Railway Association, is now preparing a new application form for exhibition space for the annual convention of the association at Cleveland, Oct. 3-7. The form will be sent out on May 16 and must be returned within the 30-day limit.

## Industrial Exposition in Cleveland

Joseph H. Alexander, president of the Cleveland Railway, Cleveland, Ohio, is the president of the committee in charge of the Cleveland Industrial Exposition, to be held in the Cleveland Auditorium from Aug. 6 to 28. The exposition committee is composed of men prominent in the financial and industrial activities of the Cleveland district.

The purpose of the exposition is to present to the world a concentrated picture of the industrial activity and human progress achieved by northern Ohio; in other words, to "sell" the Cleveland district, its products and its opportunities, to itself and to the world. It is expected that the exposition will inspire not only constructive thought in the community but will open to individual exhibitors new market fields, new accounts and increased consumption of the products displayed.

The exposition will be open from 10:30 a.m. to 10:30 p.m., daily and sunday. Exhibition space is available to products made or sold in the northern Ohio district.

## Heads of Electrical Industry Hold Policy Meeting at Briarcliff

Nearly 300 executive officers of the electrical manufacturing industry attended a two-day meeting of the Policies Division of the National Electrical Manufacturers Association, held at Briarcliff, N. Y., March 17 and 18. John H. Trumbull, Governor of Connecticut and president of the Trumbull Electric Manufacturing Company, Plainville, Conn., made the keynote address. Governor Trumbull flew from his home in Connecticut to attend the meeting. An outstanding result of the conference was a definite set-up for the three major divisions of the industry, namely, apparatus, radio and supplies.

Gerard Swope, president of "Nema," was authorized to appoint a committee to study the patent cross-licensing as practiced in the National Automobile Chamber of Commerce, and formulate a plan whereby an interchange of patents in the electrical industry may be achieved. The investigating committee is to report back to the policies division for further action.

In the opinion of those present price cutting has been found to be distinctly uneconomic for both buyer and seller. "We don't like to do business with a merchant who has three prices," said one speaker. "That is one reason for the tremendous growth of department stores. They have one price, based on actual cost and a fair profit, and they stick to it." The consensus of opinion was that a more accurate knowledge of costs will increase sales because it will not result in unintelligent shifting of prices, and it will not cause companies to go into bankruptcy when they should be making money.

The business policies committee reported on such subjects as cash discounts, terms of payment, length of guarantee terms, consigned stocks, freight allowances, service charges, appraisers, charges, and similar items.

Among other speakers were Owen D. Young, chairman of the boards of the General Electric Company and Radio Corporation of America; Clarence L. Collens, vice-president in charge of the Policies Division of "Nema"; H. D. Crouse, president of the Crouse-Hinds Company of Syracuse; A. Penn Denton, president of the Denton Engineering and Construction Company of Kansas City; F. L. Nicholson; H. P. Kirkland; Marle Thorpe, editor of *Nation's Business;* Robert A. Brannigan, manager of the patent department of the National Automobile Chamber of Commerce; L. B. F. Raycroft, vice-president in charge of the association's Radio Division, and others.

## Virginia Electric & Power Company Parades New Cars

With various city officials and business and civic club representatives as guests, the Virginia Electric & Power Company, Norfolk, Va., staged a parade for five of its new cars recently ordered from the American Car Company, St. Louis, Mo. The cars will be put in service on the Norfolk and Pinners Point run. This equipment is part of an order for ten cars placed Dec. 1, 1926. Illustrations and full specifications will be carried in a later issue of the JOURNAL.

## Diesel Prize Announced for Oil Power Week

Edgar J. Kates, chairman of the national committee in charge of Oil Power Week, has announced that it will be observed this year from April 18 to 23. It is also announced that the national committee will award a cash prize of $100, accompanied by suitable certificates, to be known as the Rudolph Diesel award. This award will be made for the best contribution toward the advancement of oil engines, either in the form of a paper presented at one of the meetings throughout the country under the auspices of Oil Power Week, or a written discussion of a paper, by any one attending any of the meetings. Manuscripts should be in the hands of the national committee not later than June 1, 1927, and

the award will be announced by Aug. 1. All persons interested are asked to get in touch with Mr. Kates at the national committee headquarters, 29 West 39th Street, New York City.

Oil Power Week observance will consist of meetings throughout the country for a discussion of subjects of oil-engine fuels, engine design, operation, economics, research problems, etc.

## Fifty Cars and Five Buses for St. Louis

Application for authority to build 50 street cars at an estimated cost of $510,000 was filed in the United States District Court on March 21 by Rolla Wells, receiver for the United Railways, St. Louis, Mo. Federal Judge Faris referred the application to Special Master Fred L. Williams for investigation and recommendation. Mr. Wells pointed out that they are needed to take care of traffic requirements.

If permission is granted the company will build the cars in its own shops. The company has built no new cars since July, 1924, and since that time 71 old cars have been retired and scrapped. Mr. Wells informed the court that funds are in reserve sufficient for the construction of the cars.

Application was also filed for permission to purchase five additional buses at a cost of $41,000. This expenditure was also referred to Mr. Williams for approval.

# Trends in the Metal Markets

COMMENCING with this issue of ELECTRIC RAILWAY JOURNAL, through the courtesy of and in co-operation with *Engineering and Mining Journal*, there will be published in these columns a weekly review of the non-ferrous metal markets. The prices quoted and the general situation will be as of Wednesday preceding date of issue.

Major non-ferrous metal markets with the exception of zinc have been generally dull during the week ended March 23, according to *Engineering and Mining Journal*. This is the third quiet week for copper, whereas lead has heretofore been moderately active. Zinc buying was close to the average in volume. Zinc, tin, silver and antimony closed the week at prices differing little from those of last Wednesday. Both copper and lead prices are lower; copper is available at 13.25 cents and lead has been cut to 7.55 cents, New York. The sinking of a vessel carrying about 800 flasks of quicksilver has created keen demand in the American market and the price has soared to about $115 per flask.

METAL, COAL AND MATERIAL PRICES
F. O. B. REFINING

| Metals—New York | March 22, 1927 |
|---|---|
| Copper, electrolytic, cents per lb | 13.025 |
| Copper wire, cents per lb | 15.25 |
| Lead, cents per lb | 7.55 |
| Zinc, cents per lb | 7.03 |
| Tin, Straits, cents per lb | 68.875 |
| **Bituminous Coal, f.o.b. Mines** | |
| Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons | $4.625 |
| Somerset mine run, Boston, net tons | 1.925 |
| Pittsburgh mine run, Pittsburgh, net tons | 1.85 |
| Franklin, Ill., screenings, Chicago, net tons | 2.25 |
| Central, Ill., screenings, Chicago, net tons | 1.875 |
| Kansas screenings, Kansas City, net tons | 2.50 |
| **Materials** | |
| Rubber-covered wire, N. Y., No. 14, per 1,000 ft | $5.50 |
| Weatherproof wire base, N. Y., cents per lb | 16.75 |
| Cement, Chicago net prices, without bags | 2.05 |
| Linseed oil (5-bbl. lots), N. Y., cents per lb | 10.80 |
| White lead in oil (100-lb. keg), N. Y., cents per lb | 14.50 |
| Turpentine (bbl. lots), N. Y., per gal | $0.76 |

As regards copper, the large producers during the present week have consistently maintained their asking price of 15.375 cents and some business had been done at that level until March 23. On the other hand, second-hands and custom smelters have been willing to shade this price. As low as 13.275 cents delivered in the East was done, but 13.30 cents represented fairly the low range of the market. A general disposition on the part of consumers, who bought heavily during February, that they can afford to wait is said to be the reason for the present situation of the market. Some of the consumers question the authenticity of the reports of curtailment and say they have been deceived by such rumors before. On the other hand, the attitude of the producers indicates that they have confidence in the belief that demand will exceed the current supply in the next few months and that they do not need to lower their present price to get business. The exporters' price remains unchanged at 13.65 cents c.i.f., though the volume of business has declined sharply during the week.

Lead demand during the last week has been much quieter than usual. With the February rate of world lead production even greater than that of January, producers feel keenly any dull period, and a pronounced tendency to shade prices to effect sales has been in evidence for the last few days. Corroding grades of lead have been somewhat scarcer than chemical lead and have generally commanded about $3 a ton premium in the Middle West. The leading producers in the Middle West have receded from the 7.40 cents, St. Louis, level of a week ago, and on March 23 were at 7.30 cents. Lead at 7.30 cents has been available all week from Friday on, first as resale lots and then from the producers. In the East what little demand there was was satisfied at the American Smelting & Refining Company's price, which continued at 7.65 cents, New York, until March 23, when the price was reduced to 7.55 cents.

Consumers took little interest in tin, either for prompt or future delivery, and dealers were not particularly active. Spot and prompt Straits sold during most of the week slightly above 69 cents, with June about 2¼ cents less. The 99 per cent grade is now only slightly less than a cent below Straits, owing primarily to decreased supply from China.

Zinc prices have fluctuated within narrow limits except for one large sale on Monday, which brought 6.60 cents. There has been some recovery since, although the price is still below that of a week ago. High-grade is quoted at 8½ cents delivered in New York.

## M. L. Sindeband Now Vice-President American Brown Boveri

Maurice L. Sindeband has been elected a vice-president of the American Brown Boveri Electric Company. Since 1915 he has been in the engineering department of the American Gas & Electric Company and he was recently elected a vice-president of this company in charge of the electrical engineering department.

Mr. Sindeband was educated at Columbia University. He started his engineering career in 1907 with the New York Central Railroad. His next occupation was station-design work with the Brooklyn Edison Company, and in 1915 he entered the engineering department of the American Gas & Electric Company. His rise here was rapid, and he was made electrical engineer in 1918. The rapid growth of the American Gas & Electric system called for working out large-scale interconnection plans and the building up of a consolidated operating organization. In this executive engineering work Mr. Sindeband was so successful that he was made a vice-president. Several patents attest his ability as an inventor. He has been very active as a writer of articles for the technical press and has presented several papers before the American Institute of Electrical Engineers.

## Car and Bus Order at Houston Held in Abeyance

Recent advices are to the effect that the purchase of twenty street cars and ten buses reported in the March 19 issue of the JOURNAL as having been bought by the Houston Electric Company, Houston, Tex., is included as part of a $1,500,000 program of expenditures dependent for its consummation upon a readjustment of the relations between the city of Houston, Tex., and the Houston Electric Company, as reviewed in the JOURNAL for March 12, page 464.

## Foreign Trade Convention Set for May 25

The fourteenth national foreign trade convention will be held in Detroit, Mich., on May 25, 26 and 27. A call for the convention, issued by the chairman, James A. Farrell of the United States Steel Corporation, states that the object is "to afford opportunity for thoughtful examination of the present condition and future possibilities of our foreign trade; to stimulate co-operation in the best use of our resources, and to secure the judgment of practical and experienced traders on the problems that confront us."

All Americans concerned in the development of foreign trade as a factor in national prosperity, whether in agriculture, commerce, education, industry, finance or transportation, all chambers of commerce, boards of trade, national and state associations, and other industrial and commercial organizations, as well as firms and individuals, are invited to participate. A full opportunity will be afforded for free discussion from the floor. The secretary of the National Foreign

Trade Council, under the auspices of which the convention will be held, is O. K. Davis, 1 Hanover Square, New York, N. Y., from whom further details may be secured.

## Bakelite Caravan Treking Through Central States

Bakelite Corporation, New York City, announces that there is now in progress throughout the Central States a traveling exhibition of Bakelite in industry. The exhibition includes the products of some two hundred manufacturers throughout the United States who have contributed their devices to be used in this demonstration of Bakelite's varied function. From March 10 to March 26 the caravan visted the following cities: Columbus, Dayton, Canton, and Cleveland, Ohio, and from March 28 to May 7 the itinerary will be as follows: Toledo, Ohio; Hotel Commodore Perry, March 30-31; Ann Arbor, Mich., University of Michigan, April 4; Hotel Tuller, Detroit, Mich, April 6, 7 and 8; Lansing, Mich., Hotel Olds, April 11; April 13, Hotel Pantlind, Grand Rapids, Mich.; Hotel Keenan, Fort Wayne, Ind., April 18-19; April 21, Hotel Grand, Anderson, Ind.; April 25-26, Hotel Lincoln, Indianapolis, Ind.; April 28, Purdue University, West Lafayette, Ind.; May 2-3, Hotel Seelbach, Louisville, Ky.; May 6-7, Hotel Sinton, Cincinnati, Ohio.

## *Rolling Stock*

**Beaver Valley Traction Company, New Brighton, Pa.,** will purchase six new passenger cars. They are to be double truck, one-man operated. Delivery is to be made by June. This purchase of cars follows the reseating of ten of twenty recently purchased single-truck cars that were found not to conform to the standard of ease and refinement set by the company for its patrons. The new seats are Kemi-Suede covered and replace those of the wood slat type. The improvement is meeting with public approval.

**Pittsburgh Motor Coach Company, Pittsburgh, Pa.,** a subsidiary of the Pittsburgh Railways, has placed an order for ten type X parlor coaches with the Yellow Truck & Coach Manufacturing Company of Chicago. The new coaches are the 20-passenger type and are similar to those now in service between East Liberty, Point Breeze and the downtown section of Pittsburgh. Delivery will be made at an early date.

**Indiana Service Corporation, Fort Wayne, Ind.,** has announced, through its president, Robert M. Feustel, that ten new city street cars will be purchased this year for operation in Fort Wayne. This is part of a $1,600,000 improvement program outlined for the city. A general plan of $2,000,000 improvement includes rehabilitation of interurban lines running through northern Indiana.

**Yellow Truck & Coach Manufacturing Company, Chicago,** reports the following bus sales to electric railways: Seven gas-electric buses, Portland Electric Power Company, Portland, Ore.; three type Z city service coaches, Los Angeles Railway Corporation, Los Angeles, Cal.; three 21-passenger city coaches to the Louisiana Electric Company, Lake Charles, La.; four 21-passenger Yellow coaches, Oklahoma Railway, Oklahoma City; three 21-passenger city service coaches, Eastern Texas Electric Company, Beaumont, Tex.

## *Track and Line*

**Fresno Traction Company, Fresno, Cal.,** has been granted a certificate of public convenience and necessity by the Railroad Commission of California to exercise the right and privilege granted by an ordinance of the city of Fresno to extend its lines upon McKenzie Avenue from the intersection of Fresno Avenue, easterly to Ninth Street and McKenzie Avenue and along Fresno Avenue from Fresno and Belmont Avenue to Olive Avenue, or the edge of the city limits of Fresno.

**Stark Electric Railroad, Alliance, Ohio,** is now laying 300 tons of new rail in and about Alliance and expects to make approximately 7,000 tie renewals during the summer months. According to a statement recently issued by E. W. Sweeney, general manager, the materials for the new work represent an expenditure of $17,000.

**Rome Railway & Light Company, Rome, Ga.,** is planning an expenditure of $75,000 on railway improvements in Rome.

**Arkansas Central Power Company, Little Rock, Ark.,** is planning to lay new rails and paving between its rails on Prospect Avenue from Lee Avenue to St. Mary's Academy. Work will commence as soon as the City Council of Little Rock grants the necessary permission. The improvement, entailing a cost of approximately $150,000, will be one of the major construction jobs of the company's 1927 program. Rail of a heavier section will replace the present 70-lb. rail, and in addition all joints will be welded.

**Dallas Railway & Terminal Company, Dallas, Tex.,** has received approval from the City Commission of Dallas for an additional expenditure of $1,100 on an extension of the Vickery Place street car line. The extension from Vickery Boulevard to Ridgedale Street was included in the extensions to be made under the Everman Plan No. 4. It was completed two months ago, but when its cost was disclosed it was found to have exceeded by $1,100 the estimated cost of $9,770. The additional expenditure authorized by the commission will be credited to the improvement fund of the traction company.

**Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.,** recently installed eight heavy ground-throw electric switches manufactured by the Cheatham Electric Switching Device Company, Louisville, Ky. Three of the switches have been placed on Washington Avenue, three on Chestnut Avenue, one on Virginia Avenue, and the two remaining switches on Hampton Avenue, and King and Queen Streets.

## *Trade Notes*

**Waukesha Motor Company, Waukesha, Wis.,** furnished the engines for the new Twin Coach designed by Frank R. Fageol of Oakland, Cal., and described in the JOURNAL of Feb. 26.

**Robert C. Lanphier** has been elected president of the Sangamo Electric Company of Springfield, Ill., to succeed the late Jacob Bunn. He had been vice-president and general manager ten years. Mr. Lanphier is also president of the Sangamo Electric Company of Canada, Ltd., and a director of the British Sangamo Company, Ltd. Otis White, general superintendent, was elected vice-president in charge of manufacturing, and Fred C. Holtz, chief engineer, was elected vice-president in charge of engineering.

**Safety Car Devices Company, Wilmerding, Pa.,** during the past eight months has furnished safety car devices for the following rolling stock orders other than those reported in detail in the ELECTRIC RAILWAY JOURNAL: Five cars, Gary Railway; 50 cars, Pittsburgh Railways; six cars, Roanoke Railway & Electric Company; five cars, Williamsport Passenger Railway; three cars, Alabama Power Company, Birmingham, Ala.

**Armco Culvert Manufacturers' Association** announces the opening of two new district offices, one in Lincoln, Neb., with Mont C. Noble, formerly chief of bureau of roads and bridges, Nebraska State Department of Public Works, as district engineer in charge, and the other office in East Point, Ga., with Tom M. Neibling, formerly research engineer, Georgia State Highway Department, as district engineer in charge. This office will be in charge of association work in Alabama, Florida, Georgia, Louisiana, Mississippi, Tennessee, North Carolina, and South Carolina, and the Nebraska branch that of the work incident to Nebraska, Kansas, Iowa and Missouri.

**The Lincoln Electric Company** announces the following changes in its sales personnel: G. N. Bull, formerly with the Worthington Pump & Machinery Company in its Washington, D. C., office, has been made district manager of the New York office; C. S. Freeman, previously in charge of the Lancaster office, has been transferred to the Buffalo office and made district manager; S. W. Shultz, formerly of the Philadelphia office, has been put in charge of the Lancaster office, and E. J. Pfister, formerly of the Buffalo office, has been transferred to the Philadelphia office.

**Nichols-Lintern Company, Cleveland, Ohio,** is now prepared to furnish the N-L bus heater, which has been under development in practical service and according to the maker has proved its capacity to provide a comfortable heated vehicle and exceptional ventilation.

**Bragg-Kliesrath Corporation, Long Island City, N. Y.,** has recently furnished 100 brakes to the Chicago Motor Coach Company and 37 brakes to the Fifth Avenue Coach Company, New York City.

# "PEACOCK"

Reg. U. S. Pat. Office.

STAFFLESS BRAKES

## *Are standard equipment on nearly all Modern Cars!*

Modern car design demands them because of their many advantages, such as: Maximum braking power (three times that of the ordinary hand brake), Ample chain winding capacity (144 inches if necessary), least platform space, simple operation, unfailing reliability, light weight, low installation and maintenance costs.

There are other advantages which especially adapt "Peacock" Staffless Brakes to modern cars. Look over the specifications of modern cars. In almost every instance you will find "Peacock" Staffless Brakes.

We will be pleased to mail detailed information upon request.

**National Brake Company, Inc.**

**890 Ellicott Square** **Buffalo, N. Y.**

*Canadian Representative:*
**Lyman Tube & Supply Co., Ltd., Montreal, Can.**

JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

*Announcing—*

# The TWIN COACH
## by F. R. FAGEOL

The history of progress tells an age-old story of new and better methods superseding methods that were good for a time but have been surpassed.

Now comes the Twin Coach—the work of the same man who was so prominently identified in giving the Safety Type Coach to the transportation world.

Glance over these outstanding features of the Twin Coach. They tell in outline why motor coach designers and operators hail the Twin Coach as forerunner of a new era in motor transportation.

1. Seating capacity 42.
2. Weight per passenger seat reduced 40%.
3. Chassis and body are combined in one unit.
4. All stresses are equally distributed.
5. Safety increased by placing driver in extreme front end.
6. Two 60 HP. motors mounted midship in each side of body.
7. Each rear wheel is driven direct by each motor.
8. All driving stresses reduced one-half.
9. Load equally distributed on all 4 wheels and springs.

*For further information address—*

**F. R. FAGEOL**
**120 Broadway, NEW YORK CITY**

*Factories:*

Cleveland, Ohio
West 106th St.

Oakland, Calif.
c/o Fageol Motors Co.

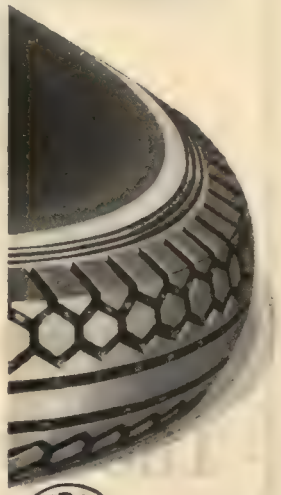
# TWIN COACH

# *This simple stunt adds many miles to Balloon Tires*

It's hard to guess how much mileage you will get from balloon tires. They look much alike—on the outside.

But from a cross-section as shown up in the corner—it is easy to see why INDIA Balloons give the ideal combination of comfort and long wear.

In the smaller passenger car sizes, four plies of cords at the side-walls—bending like a Damascus blade—easily allow and still defy that extreme flexing action at the low air-pressures which make balloon tires more comfortable. And six plies of cords under the tread give real protection against punctures and road wear.



INDIA quality of materials and ideals of workmanship make this patented construction feasible.

Go to an INDIA dealer. See and feel how an INDIA Balloon tire is made. Try one —with a True-Blue [HEAT-PROOF] Inner Tube (another exclusive India feature).

Then you'll understand why INDIA can give you the utmost uninterrupted mileage you can buy in a balloon tire.

# INDIA TIRES

INDIA TIRE & RUBBER CO. AKRON, OHIO

*Announcing the New*

# Studebaker

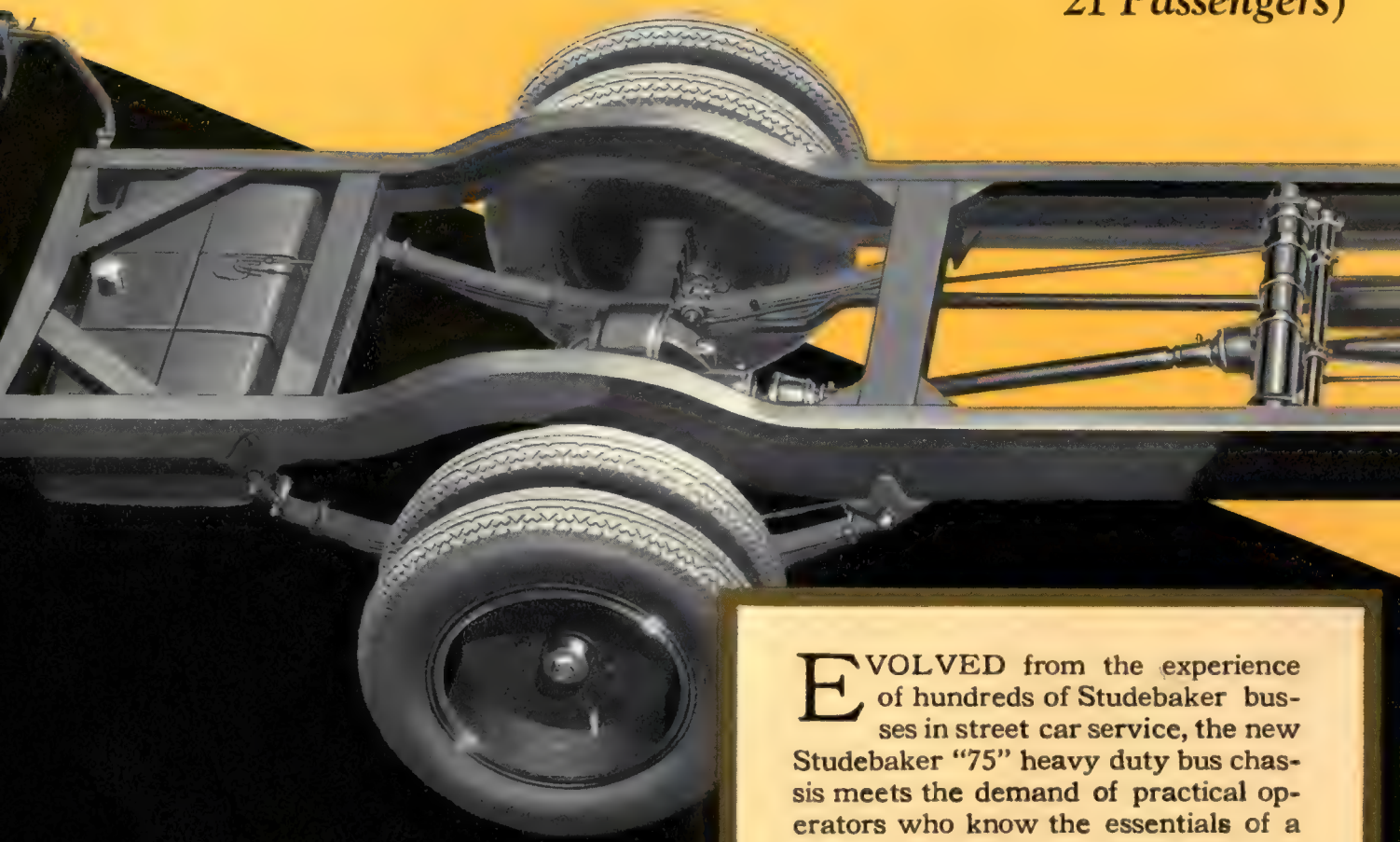
# 75

# Bus Chassis

## For Heavy City Service

# Built for the of street car

*(Seating Capacity 21 Passengers)*



EVOLVED from the experience of hundreds of Studebaker busses in street car service, the new Studebaker "75" heavy duty bus chassis meets the demand of practical operators who know the essentials of a successful street car type chassis.

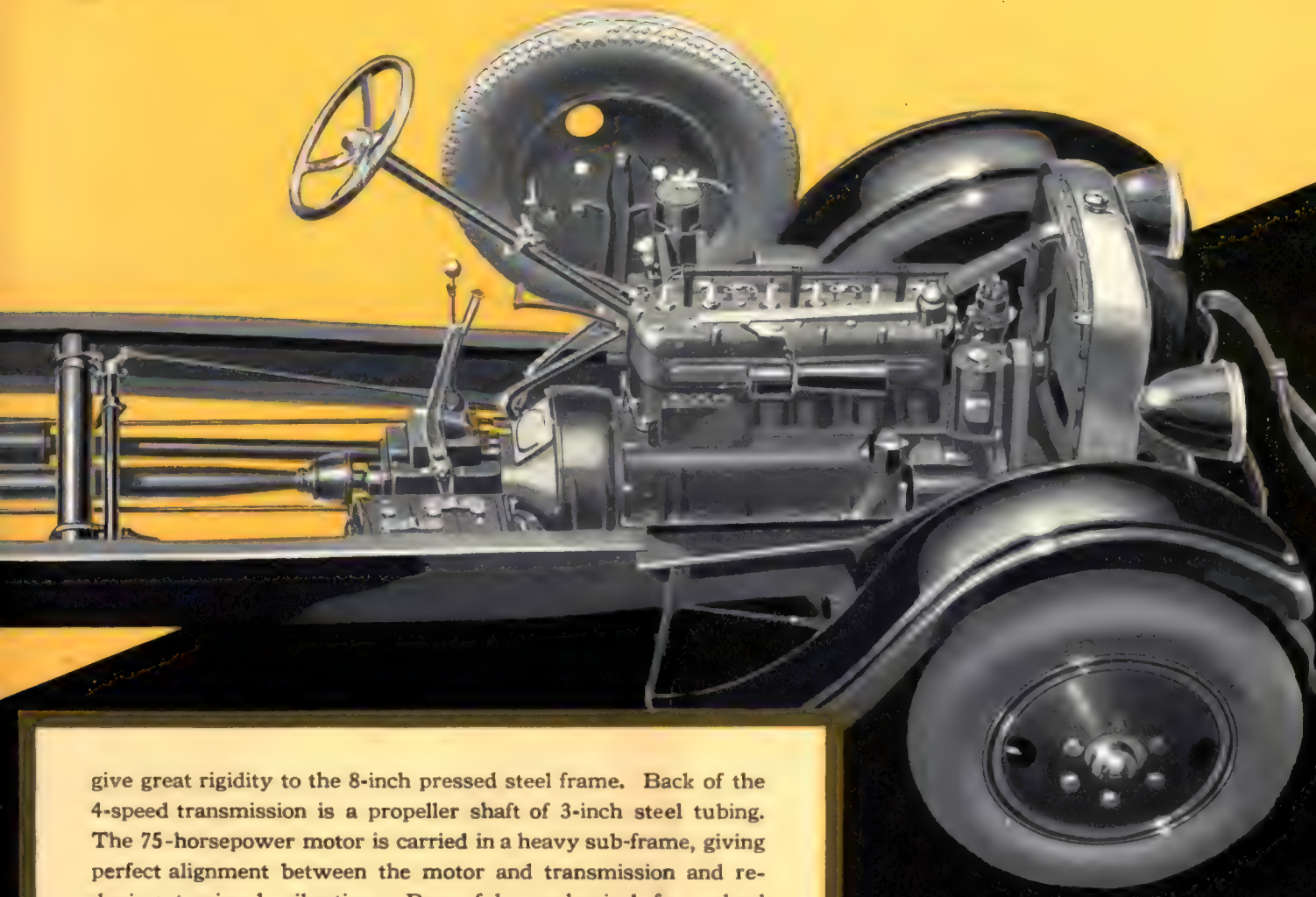
The Studebaker "75" chassis is a masterpiece of rugged construction. Its stamina has been proved by thousands of miles of gruelling tests across the United States and on Studebaker's million dollar proving ground.

A lower center of gravity is obtained and the rear ramp eliminated by dropping the frame back of the wheel housing. Nine stout cross-members, including two large tubular units

*The New*

**STUDEBAKER 75**

# heavy demands type service



give great rigidity to the 8-inch pressed steel frame. Back of the 4-speed transmission is a propeller shaft of 3-inch steel tubing. The 75-horsepower motor is carried in a heavy sub-frame, giving perfect alignment between the motor and transmission and reducing torsional vibration. Powerful, mechanical four-wheel brakes of the self-energizing type, supplemented by a hand brake acting on the rear wheels, give positive control.

Riding comfort is insured by the extra heavy, six-ply full balloon tires and improved springs. The front tread is 67 inches giving a short turning radius. Wide spacing of the rear dual wheels allows chains to be applied quickly and easily.

*For further information write Dept. B*

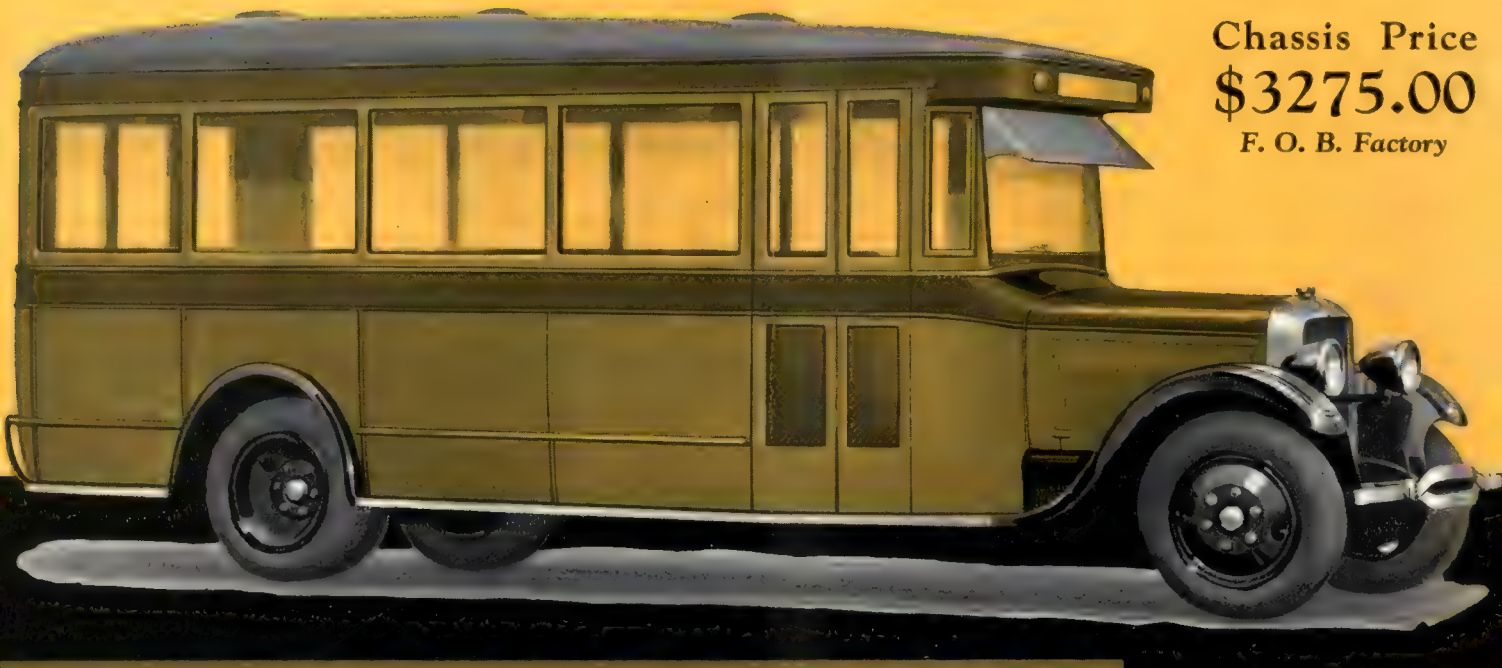
The Studebaker Corporation of America
South Bend, Indiana

# Heavy Duty Chassis

# The New Studebaker "75" Street-Car-Type Bus

*(Seating Capacity: 21 Passengers)*

Chassis Price
**$3275.00**
*F. O. B. Factory*



DESIGNED by Studebaker to meet the severe demands of constant starting and stopping, with abundant power and speed, the outstanding bus engineering triumph of the decade is the new Studebaker "75" heavy duty Bus Chassis. Its sturdy construction, due to the wide use of special alloy steels, guarantees tremendous mileage and low depreciation. Amply powered with the Studebaker 75 horsepower engine it takes grades like a passenger car. Operating costs are unusually low. Fifty per cent lower in first cost than any bus of comparable quality, the Studebaker "75" offers the soundest investment in the present day bus market. This means greater profit for the operator with less invested capital.

The extra large mechanical four-wheel brakes are velvet smooth, yet positive in action. These brakes, 17½ inches in diameter with lining 3 inches wide have three expanding shoes which utilize the speed of the vehicle to increase the braking action.

*(Below)*
A spiral bevel, semi-floating type rear axle, specially designed for the new Studebaker "75" chassis, is carried in a cast steel housing of great truss strength.

*Above—Concrete Signal Tower, Southern Pacific Railroad, Oakland Pier, California.*

*At left—Interior view of Concrete Signal Tower, Oakland Pier, California.*

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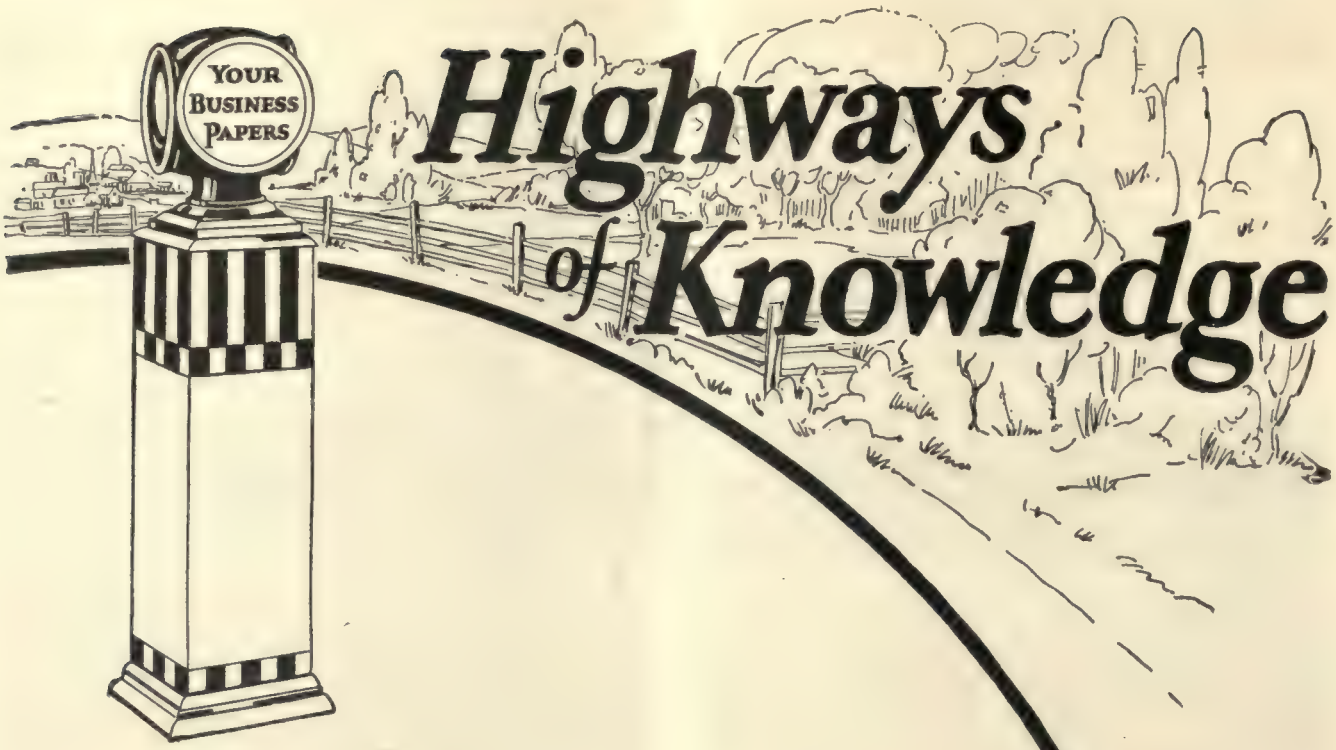
RAILROAD OFFICIALS realize the folly of gambling with the safety of life and property. They insist upon the most efficient traffic control systems that human ingenuity can devise.

Signal towers of *portland cement concrete*—durable, fire-safe and economical—offer the *utmost* protection to the control equipment upon which safety and continuous operation depend.

PORTLAND CEMENT *Association*

*Concrete for Permanence* CHICAGO

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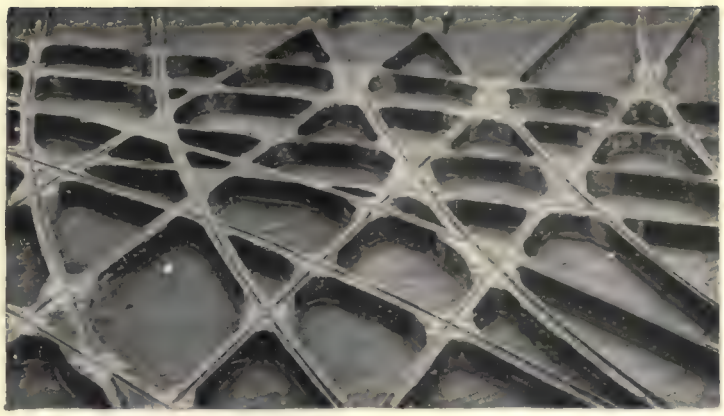

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THE BUDA COMPANY HARVEY, ILL.

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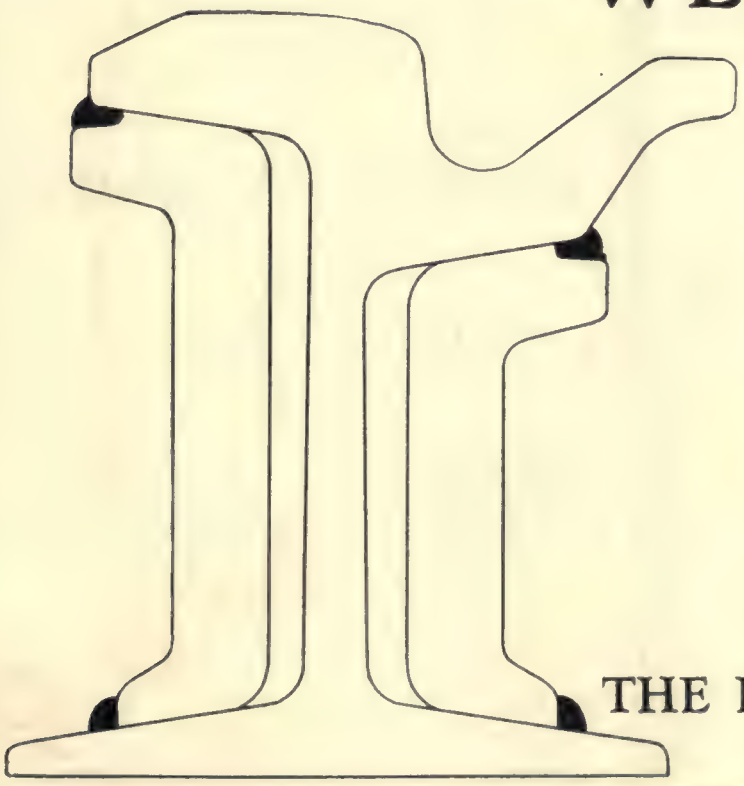

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## JOINTS

Do you believe in statistics? Rely on performance records? If so the performance records of the many "Weld Plates" now in use will convince you that they lead the bar-weld joints in efficiency and economy.

"Weld Plates" represent the most modern welding practice. They are the strongest and most up-to-date plates rolled especially for electric welded joints. Note the shape—the grooves for retaining plenty of weld metal along the upper edges—the wide contact areas at top and bottom—the suitability for the use of short bolts.

A trial will convince you of their efficiency and economy.

THE RAIL JOINT COMPANY

165 Broadway, New York

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No important Hindu ceremony can be performed unless the distinguishing mark of that ceremony is first placed on the forehead (ooska sirr).

In other words, when you see a crowd gather, you don't have to elbow up to some bystander to ask "What's all the shootin' fer?"

You simply lamp the mark and refer to your little book.

All of which prompts us to suggest that when you buy a machine to perform a certain function, refer to your Morganite book and choose the exact distinguishing mark:

Link 1 Morganite
or Link 6 Morganite
or whatever Link mark identifies
the brush with the proper characteristics
for that SIRRvice.

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with
Chilled Rims
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For Street and Interurban Railways

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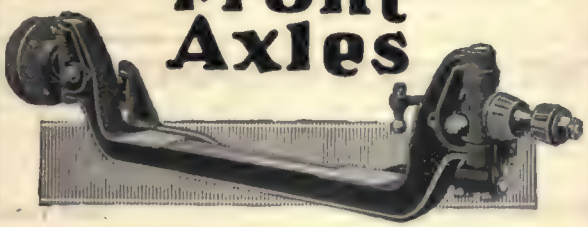
# Shuler Front Axles



For MOTOR BUSSES

## One Business One Purpose

The member of any profession who deals in one specific phase of his calling is better able to cope with specialized problems. We too, have but one purpose — FRONT AXLES ONLY—and produce a quality unit.

## Front Axles Only

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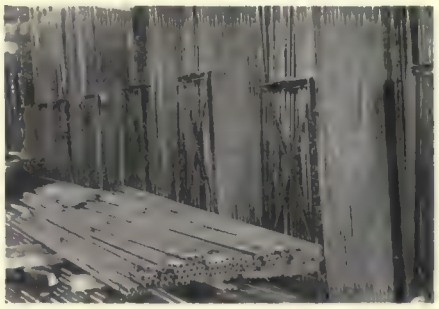
# Do You Buy Repairs For Your Packard At the Five and Ten?



Trolley Pole Stock in Nuttall Store Room

Not on your life. You know that only Packard can turn out Packard cars and parts—you can't afford to take any chances.

But how about trolley parts and accessories? You should see some of the junk *we* see. Oh Man! soft, scrap brass trolley wheels, where the best of phosphor bronze is hardly good enough. Heavy, cast iron harps, where lightest malleable iron or forgings have their own troubles to stand the gaff.

Poles made of almost any kind of tubing, where heat treated steel, reinforced, carefully swedged and tapered is Nuttall Standard.

Springs!—well just springs, that's all. A spring is a spring, but the service requires the Nuttall Spring, designed to give the right tension, the right wheel contact pressure on the wire—oil tempered springs that *spring* and don't set.

**Trolley parts—run of mines stuff—actually cost you more money than genuine, guaranteed Nuttall parts. No substitute is ever as good. Ask the man with a glass eye.**

***Send for a Nuttall Catalog and Price List***

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1927

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Our advertisement in the issue of April 16 showed how

## HASKELITE and PLYMETL

modernize your car construction whenever repairs are to be made as well as when you buy new equipment. Haskelite has been specified on a recent order for repair work for the Chicago, North Shore & Milwaukee Railroad. *Another ad will appear May 7*

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133 W. Washington St., Chicago, Ill.

## THE P. EDWARD WISH SERVICE

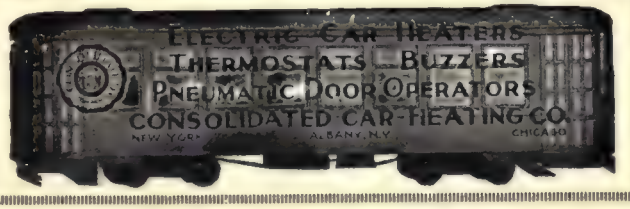
50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Hale and Kilburn SEATS

Better Quality Seats For Cars and Buses

Hale-Kilburn Co.
1800 Lehigh Ave., Philadelphia, Pa.

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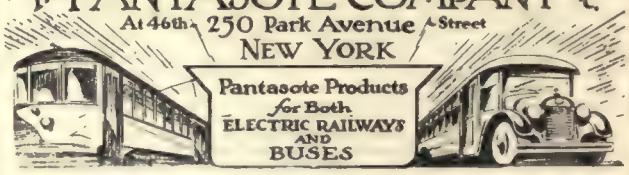


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Standard Steel Works
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Shuler Axle Co.

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Columbia Machine Works
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**Bodies, Bus**
Brill Co., The J. G

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American Steel & Wire Co.
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Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
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Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
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Cincinnati Car Co.
National Ry. Appliance Co.
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American Brake Shoe & Foundry Co.
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National Ry. Appliance Co.

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Brill Co., The J. G
Cincinnati Car Co.
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Columbia Machine Works

**Cables (See Wires and Cables)**

**Cambric Tapes, Yellow and Black Varnish**
Irvington Varnish & Ins. Co.

**Carbon Brushes (See Brushes, Carbon)**

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**Car Panel Safety Switches**
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Westinghouse E. & M. Co.

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Cincinnati Car Co.

**Car Wheels, Rolled Steel**
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Differential Steel Car Co.

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General Electric Co.
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Brill Co., The J. G.

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Cincinnati Car Co.
Kuhlman Car Co., G. C.
Wason Mfg. Co.

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Standard Steel Works

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Columbia Machine Works & M. I. Co.

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Wood Co., Chas N.

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Pantasote Co., Inc.

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Portland Cement Ass'n.

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Electric Service Supplies Co.

**Change Trays**
Cincinnati Car Co.

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Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Cincinnati Car Co.
Ohio Brass Co.

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(Continued on page 40)

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*Electrically Welded Joints*

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**Interurban Cars (See Cars)**

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Nat'l. Ry. Appliance Co.
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Railway Trackwork Co.
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**Welding Steel**
Railway Trackwork Co.
Una Welding & Bonding Co.

**Welding Wire**
American Steel & Wire Co.
General Electric Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

**Welding Wire and Rods**
Railway Trackwork Co.

**Wheel Guards (See Fenders and Wheel Guards)**

**Wheel Presses (See Machine Tools)**

**Wheels, Car, Steel & Steel Tire**
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Carnegie Steel Co.
Griffin Wheel Co.
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**Wheels, Wrought Steel**
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Okonite-Callender Cable Co. Inc.
Roebling's Sons Co., J. A.
Westinghouse E. & M. Co.

*The Raleigh Ry. & Electric Company have placed six new Brill Modern Cars in service*

# Save and Earn with Brill Modern Cars

The possibilities offered by a type of car for both saving and earning determines whether or not it may be classed as a truly modern car. It must have a two-fold purpose. To win increased patronage, attractive appearance, riding comfort, convenience and efficiency and safety in operation must be taken into consideration. Durability in service, with low maintenance expense, must also be considered, along with low power cost resulting from light weight.

Brill Modern Cars are designed only after a careful analysis of service requirements and are equipped in accordance therewith. That's why railways operating them both save and earn at the same time.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST LOUIS MO — G.C. KUHLMAN CAR CO. CLEVELAND OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

# BRILL

## No. 202-B-1 Seat

# An Interurban Car Seat of Distinction

The unusually comfortable slope to cushion and pitch to back permitted by the new Brill seat reversing mechanism has now been applied to interurban car seats represented by the Brill No. 202-B-1 type illustrated. This mechanism is not only positive in reversing action but its simplicity and strength recommend it for long and satisfactory service. Its development is the result of a wide experience in seat construction.

A double-deck spring cushion construction and a soft two-part semi-individual back also contribute to that high degree of comfort so essential in high-speed interurban service.

The Brill No. 202-B-1 Seat is particularly adapted to the lighter weight modern types of interurban cars.

Complete information upon request to

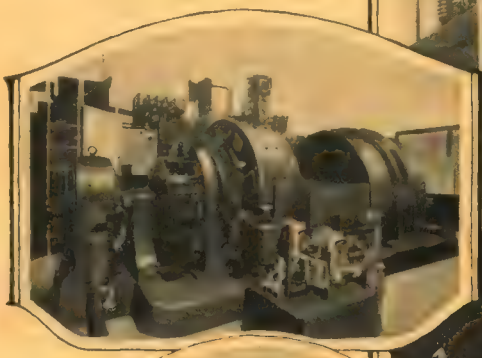
**THE J. G. BRILL COMPANY**
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

1. *The main switchboard of the 1500-kw. station of the Key System Transit Company, Oakland, Calif.*

2. *The synchronous motor-generator set.*

3. *The concrete substation building.*



# 300% loads allowed and successfully handled

This automatic substation of the Key System Transit Company handles 300 per cent load until the temperature approaches a predetermined limit, then drops the load to 150 per cent and, if necessary, to 100 per cent. When cool, it again automatically takes the original load. Human operators could not be so accurate.

This station operates selectively from either of two 11,000-volt feeding circuits, automatically switching from one to the other if trouble occurs on either line. Supervision of operation from a remote point is also possible.

The removal of $11,000 worth of copper feeder cable and a decrease in feeder losses from 22 per cent to 9.6 per cent were immediate results. An 11 per cent increase in track capacity was also obtained.

This important station of the Key System Transit Company is a progressive departure from ordinary automatic substation practice. Its successful operation provides additional proof of General Electric's ability to design for the particular and peculiar demands so often encountered in railway service.

130-1

# GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

ill Publishing Company, Inc. April 2, 1927 Twenty Cents per Copy

# ELECTRIC RAILWAY JOURNAL

The trade mark of the colored spots on Samson Spot Cord identify the trolley cord giving the longest service, the most ease of manipulation in all weathers, and the greatest ultimate economy.

SAMSON SPOT
TROLLEY CORD

SAMSON CORDAGE WORKS
BOSTON

# Local Freight Haulage

## *Increases Profits on Many Electric Lines*

Aroostook Valley Railroad

Monongahela West Penn Public Service Co.

Southern Pacific Company

Hoboken Manufacturers' Railroad Co.

Utah-Idaho Central Railroad Co.

Sacramento Northern Railroad

Toledo & Western Railway Co.

Piedmont & Northern Railway Co.

Glendale & Montrose Railway

Youngstown & Ohio River Railroad

The Baldwin Locomotive Works
Philadelphia, Pennsylvania

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1927

# Baldwin-Westinghouse

X91095

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# ELECTRIC RAILWAY JOURNAL

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London, England

*Vol.* 69
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# Making Precedent

"MEET the Judge" is occasionally fraught with consequences as dangerous as "Meet the Wife." However, the former introduction often leads to a reawakening of learning and a reorientation in the changed status. Through court decisions, actions become more clearly defined and carefully hidden motives are revealed in all their glory or grimness.

In the first issue of each month ELECTRIC RAILWAY JOURNAL carries a feature page of "Legal Notes." These are carefully selected from recent outstanding court decisions affecting the railway and bus industry. An up-and-doing railway executive should know why that bus operator in Oshkosh was held liable and a motorman in New Jersey was exonerated. The JOURNAL puts this information on his desk regularly in convenient form for reference.

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1927

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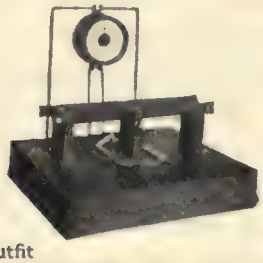
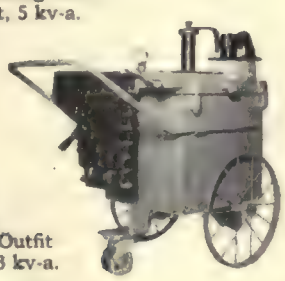
Armature Testing Outfit



Coil Testing Outfit

Insulation Testing Outfit
2,000 Volt, ½ kv-a

Insulation Testing Outfit
16,000 Volt, 5 kv-a.



Oil Testing Outfit
30,000 Volt, 3 kv-a.

# He Knows It's Right!

A REPAIRED armature or any other piece of electrical apparatus should be tested—electrically—to insure against defects.

The machine illustrated above detects open and short circuits in the coils of an assembled armature. Other outfits are used to test separate coils for defective insulation by impressing a high voltage between the winding and ground. Whatever may be your testing requirements, there is a Westinghouse outfit to meet each class of service—developed for use in the Westinghouse factories.

At the left are a few of them—those that meet the usual needs of a railway motor repair shop.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

MEMBER NEMA AERA 1927

# Westinghouse

X91158

Electrical Testing Outfits

# Setting the Standards For Efficiency and Low Cost

The O-B Trolley Catcher instantly and positively catches and holds a flying pole without danger of "stepping up". Regardless of the rebound of the pole and resultant slack rope, it does not let go. Requires lubrication only at long intervals.

The O-B Retriever quickly stops and pulls down a flying pole clear of the overhead. It is positive and powerful enough to overcome the heaviest trolley rope tension. It is your assurance against broken trolley poles and a damaged overhead.

YOU SEE O-B Trolley Catchers and Retrievers on city and interurban cars the world over. Make a point of investigating their records of service. You will find thousands that have been in use from five to ten years. And by far the greatest percentage have given continuously reliable, efficient service with practically no expense for repairs or replacements.

Simplicity, accuracy, and strength in every detail of design and construction are the reasons for such records of service. Both O-B Catchers and O-B Retrievers are made with the fewest possible parts—the minimum that will insure automatic operation. These parts are accurately machined in jigs and given individual inspections, thus insuring interchangeability. All the materials used are sufficiently sturdy to insure a large factor of safety above the most severe service requirements.

In every emergency, O-B Catchers and Retrievers act positively and promptly, even after years of use and abuse. This fact plus their exceptional economy from the maintenance standpoint certainly makes it worth while to use them as standard on your cars.

*May we arrange a demonstration? Address*

**Ohio Brass Company, Mansfield, Ohio**
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
285C

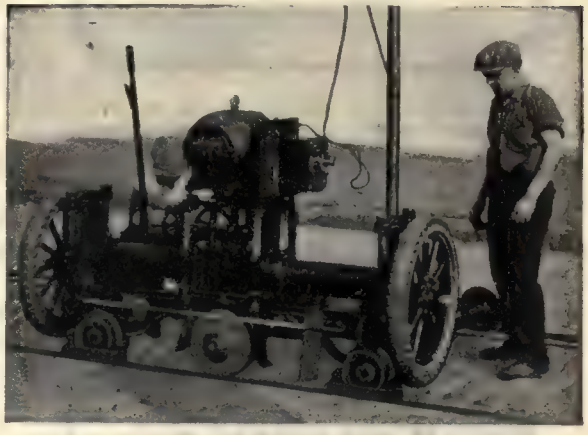
# Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

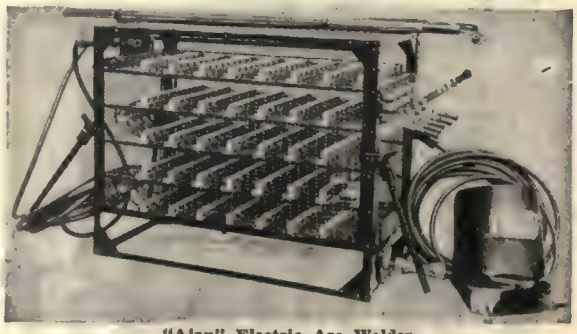
SAVING THE RAIL SAVES THE RAILWAY

# Modern track for modern cars

"Improved Atlas" Rail Grinder


"Imperial" Track Grinder

Reciprocating Track Grinder


"Ajax" Electric Arc Welder

Light weight cars may reduce track costs, but only good track will reduce car costs.

You don't gain a thing by running fine new light-weight cars over corrugated track, cupped joints and battered special work. It costs less to maintain the track than to maintain cars run on track that isn't in good shape.

Modern track is well maintained track. Good rail maintenance saves cars and the whole track structure. Modern track maintenance is easy and economical with these modern grinders and Ajax electric arc welders.

*Have you bulletins? Have you quotations? Hurry? Wire! Or phone.*

**Railway Track-work Co.**

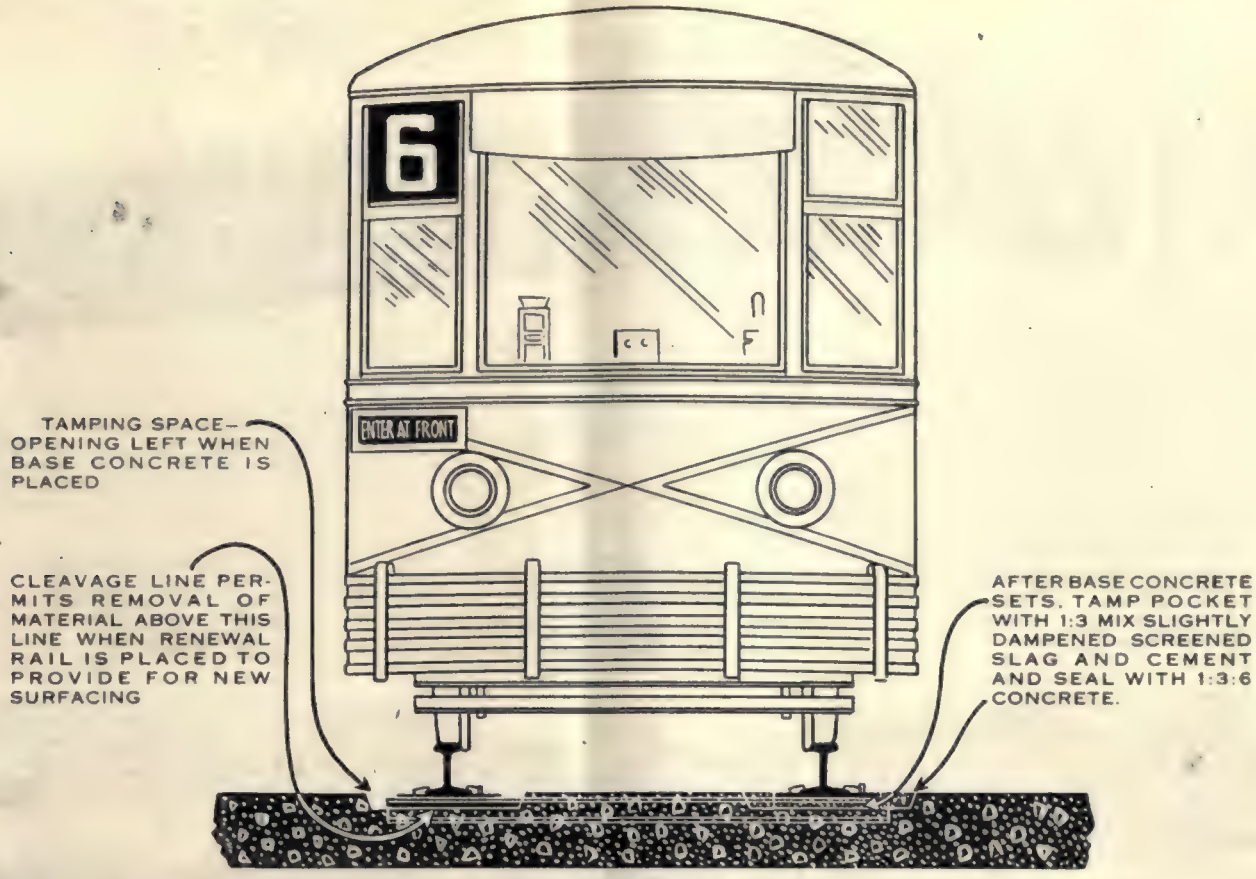
3132-48 East Thompson Street, Philadelphia

AGENTS

Chester F. Gailor, 30 Church St., New York
Chas. N. Wood Co., Boston
Electrical Engineering & Mfg. Co., Pittsburgh
H. F. McDermott, 208 S. LaSalle St., Chicago
P. W. Wood, Railway Supply Co., New Orleans, La.
Equipment & Engineering Co., London
Frazar & Co., Japan

1393

SAVING THE RAIL SAVES THE RAILWAY




# "Street Cars" are passé— so is rough and bumpy track

THE new term is "Electric Rail Coach" —New paint—new seats—new and lower costs per car mile and, what is more important from both an operating and selling standpoint—New Track.

To get the same money-saving possibilities in track construction as you get from the new equipment, lay Steel Twin Tie Track on your 1927 paved street work.

Using the delivered price on Twin Ties with the man-hour detailed estimate sheet which comes with the quotation, will give a close estimate on the money-saving possibilities under your local conditions.

*The* INTERNATIONAL STEEL TIE COMPANY, Cleveland, Ohio

Renewable Track? Rail Tilting? Rigidity? Flexibility? Noise? Old Concrete Base? Costs? Bearing? Construction Methods?

*Look it up in your "Paved Track Note Book"*

# Steel Twin Tie Track

# PROTECTION

Large slices of the taxpayers' money go to insure national protection.

Expensive protective organizations patrol our cities.

We are accustomed to pay well for protection and consider the cost a good investment.

Seldom is greater protection secured without additional cost, but the Davis "One Wear" Steel Wheel is an exception.

Protection against wheel failure from impact load is doubled by the use of a special heat-treated steel with the unusual physical properties.

Davis "One Wear" Steel Wheels are the safest steel wheels you can buy.

**AMERICAN STEEL FOUNDRIES**

NEW YORK CHICAGO ST. LOUIS

*Photos courtesy of G. C. Kuhlman Car Co.*

## Wheeling Public Service sells their service by means of modern cars

There's no question where this car is going —Elm Grove—the destination sign settles that.

The headlight looks business-like—as if greater safety at night were desired. And it is.

Take a look inside the car. The lights are well arranged and scientifically designed to illuminate the whole interior.

The signal system within easy reach of passengers is another convenience that creates public good will.

Those are the touches that Keystone Equipment give to the fifteen modern one-man two-man cars recently put in service by the Wheeling Public Service Company.

We can help you sell YOUR service too.

### KEYSTONE EQUIPMENT on each of Wheeling's new cars.

**Type RR 128 Golden Glow Headlights.**
**Hunter-Keystone Signs.**
**Ivanhoe Miller Light Fixtures.**
**Faraday Passenger Signal System.**

***For further information about the complete line of Keystone Car Equipment—get ESSCO Catalog No. 7.***

# ELECTRIC SERVICE SUPPLIES CO.

**PHILADELPHIA**
17th and Cambria Sts.

**NEW YORK**
50 Church St.

**CHICAGO**
Illinois Merchants' Bank Bldg.

PITTSBURGH
1123 Bessemer Building

BOSTON
88 Broad St.

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Bldg.

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

# WESTINGHOUSE "VARIABLE LOAD" BRAKE

STABILIZED STOPABILITY throughout the entire range of car-loading means—

—safe and swift car movement, through congested districts;

—ability to hold traffic position with other moving vehicles, inasmuch as peak speed can be held longer between stops;

—a precise and systematic movement of shopping and business crowds;

—seconds saved, that may collectively be counted as dollars;

—stimulation of public good will, through a gratifying on schedule record over the entire system.

Many traction companies, recognizing the auspicious part Westinghouse Variable Load Brakes can play in effecting these far-reaching advantages, are specifying this new type equipment for their new modern light weight cars.

## gives Uniform Braking with Varying Load

**Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office—**

***Ask for Descriptive Catalogue T-2045.***

**Westinghouse Traction Brake Company**
**General Offices and Works: Wilmerding, Pa.**

# WESTINGHOUSE TRACTION BRAKES

# Bucking competition – and winning in the face of cut rates with YELLOW COACHES

## The CANNON BALL

YELLOW KNIGHT

# A direct case where YELLOW COACHES were purchased especially to meet stiff competition

TWELVE Yellow Type X Coaches operate 3,000 miles a day for The Cannon Ball Transportation Company of Portsmouth, Ohio, over their 150-mile route from Columbus to Huntington, W. Va.

This equipment was not purchased lightly. It was selected with great care to meet severe transportation competition by appealing directly to passenger comfort; to give, as this company expresses it, "*what we consider the most comfortable riding equipment that money can buy.*"

Notwithstanding the fact that other lines were cutting their fares in half, the rider appeal of Yellow Coaches is accomplishing what was expected, building the route and justifying in every particular the purchase of Yellows.

Eight Yellow Coaches were placed in service in August, 1926, and four others began operating a few months later. Each Yellow Coach averages 250 bus miles per day (a daily total of 3,000 miles for the fleet) at the profitable operating cost of 17.51 cents per mile, broken down as follows—

| | |
|---|---|
| Maintenance of plant and equipment | 5.50 |
| Operating Garage Expenses | 4.21 |
| Transportation | 5.70 |
| Traffic Promotion | .60 |
| Administration and General Expenses | 1.50 |
| Total | 17.51 cents |

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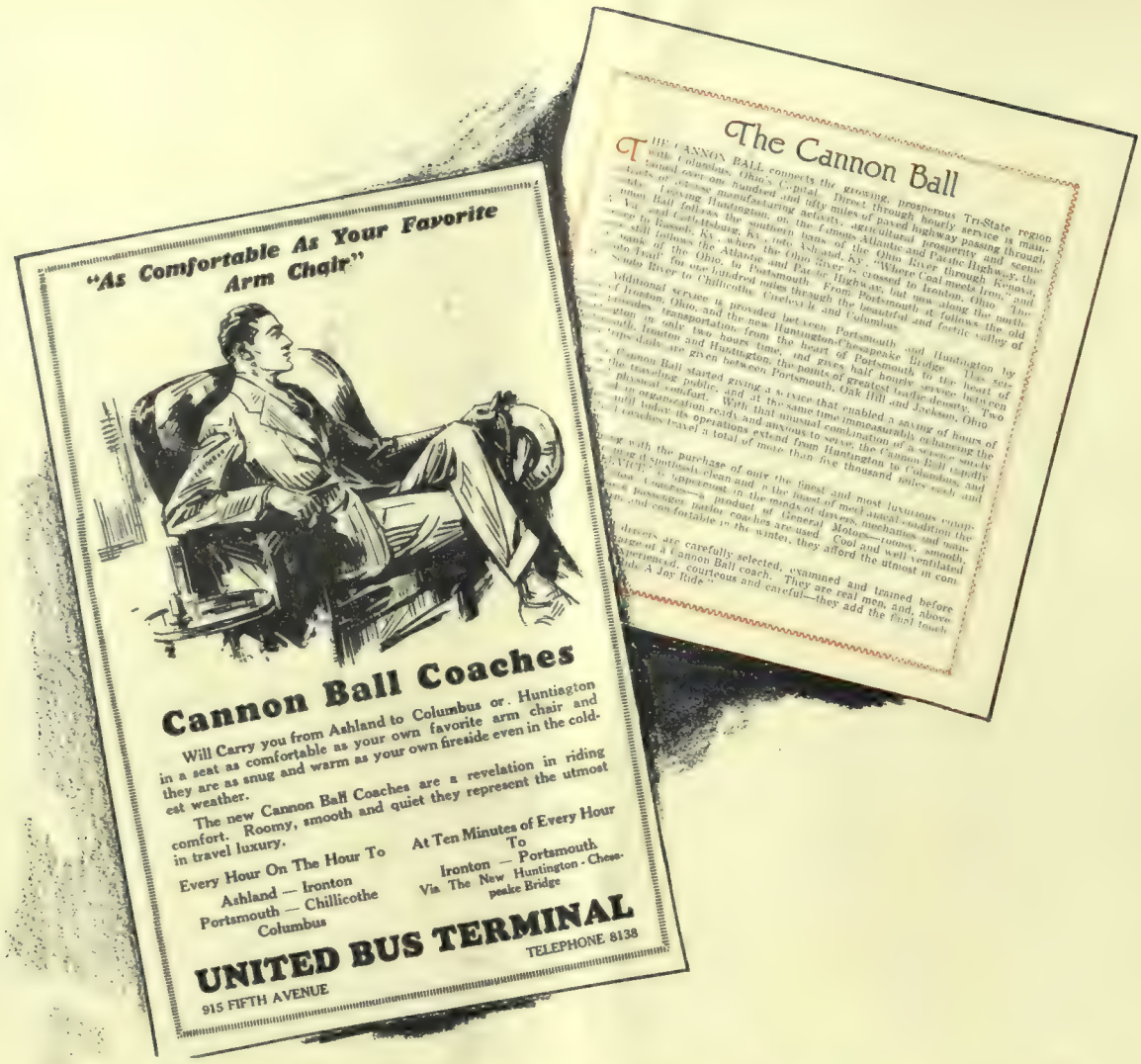



# How the Cannon Ball advertises YELLOW COACHES *to build business*

"Beginning with the purchase of only the finest and most luxurious equipment and keeping it spotlessly clean and in the finest of mechanical condition, the ideal of SERVICE is uppermost in the minds of drivers, mechanics and management. Yellow Coaches—a product of General Motors—roomy, smooth, quiet, twenty-one passenger parlor coaches are used. Cool and well ventilated in summer, warm and comfortable in the winter, they afford the utmost in comfort and luxury."

Yellow Coach *plus* General Motors, through combined transportation, research and manufacturing experience, stand ready to apply these resources to your problems.

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.

NP

# "The FRIENDLY COOPERATION OF THE PUBLIC"

**"OBTAIN the friendly cooperation of the public. . . . Adopt modern methods and equipment," says the Advisory Council of the A. E. R. A.**

By removing the annoyances and dangers of manually operated doors on street cars, by eliminating friction and congestion in the aisles and at the entrances and exits, by reducing standing time and increasing schedule speed, N. P. Door and Step Equipment has done much to win "the friendly cooperation of the public."

## NATIONAL PNEUMATIC COMPANY

*Executive Office,* 50 Church Street, New York

*General Works,* Rahway, New Jersey

CHICAGO
518 McCormick Building

PHILADELPHIA
1010 Colonial Trust Building

MANUFACTURED IN TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

# Thermit— so easy to install!

Thermit-welding holds no terrors for the small company, with limited engineering and construction facilities. Dozens of small properties are numbered among the regular users of Thermit.

The apparatus is simple and inexpensive. You can buy it or rent it—as you choose.

Thermit experts come on the first job. Your own men are shown the process and methods—they're easy to learn. The service of these experts is also available at any time to help you in making the process meet your requirements. Any foreman of average intelligence can handle the job after it's demonstrated to him.

**Let us tell you of roads near you which are using Thermit. Visit them and find out how easy it is.**

THERMIT

THERMIT

**METAL & THERMIT CORPORATION**

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

# BALANCED DESIGN

## *The result of a merchant's viewpoint on car-building*

Mr. Willits H. Sawyer said, in his recent talk before the members of the Midwest Electric Railway Association, that electric railway operators must cultivate a merchant's viewpoint rather than the engineering viewpoint on electric railway operation.

We submit that BALANCED DESIGN as applied to Cincinnati Lightweight NEW Car building exactly carries out this idea of a merchant's viewpoint.

The merchant sees to it that his store front challenges the attention of the passer-by. Balanced Design sees to it that every exterior line of the Cincinnati Car offers a distinctive and compelling invitation to ride.

The merchant furnishes his store interior with every comfort and convenience for his patrons. Balanced Design has produced car interiors comparing in comfort, in restful appearance and convenience with the best that modern transportation can offer. Curved Side Construction affords 7½ in. greater inside width without sacrifice of clearances.

Finally the merchant looks well to the maintained quality of his merchandise. And Balanced Design has assured through Unit Construction and radical improvements in both car frame and truck design that Cincinnati Lightweight NEW Cars can be maintained economically at NEW-era efficiency, appearance, and riding comfort throughout their service life.

Space on this page is limited, but we will gladly go into the actual facts and figures of our plan with any interested electric railway executive.

CINCINNATI CAR COMPANY
Cincinnati, Ohio

CINCINNATI *New* CARS

*A step ahead of the modern trend*

# American BROWN BOVERI

*Money*

## PRINCIPAL PRODUCTS

*Mercury-Arc Power Rectifiers (steel enclosed)*
*Electric Locomotives—for any system of current, high or low tensions.*
*Complete equipment for railway electrification*
*Rotary Converters*
*Motor Generators*
*Complete equipment for outdoor and indoor substations*
*Diesel - Electric Locomotives*
*Automatic Regulators*
*Steam Turbo - Generators for normal or high pressures and superheats*
*Oil Switches and Circuit Breakers*
*Transformers*
*Turbo - Compressors and Blowers*
*Ships*
*Diesel Driven*
*Turbine Driven*
*Electrical Driven*
*Dredges and Harbor Equipment*

# Mercury-Arc Power Rectifiers

## *saved in the sub-station is as good as money dropped in the fare box*

Revenue is revenue. How it comes in, where it comes in doesn't matter. The fare box is only one source. The sub-station is another, *provided* you install equipment that earns it.

American Brown Boveri Mercury-Arc Power Rectifiers *do save money.* $730.00 per year, in one case, for an Interurban Railroad in the East. Pitted against rotary converters, the savings represent the interest on more than $10,000 to say nothing of a more than 50% reduction in cost of maintenance.

Definite characteristics of A-B-B Mercury-Arc Power Rectifiers are easily recognized. Efficiency high over the whole working range. Simple operation and minimum attention. No synchronizing. Very high momentary overload capacity and insensibility to short circuits. Low weight. No special foundations. Noiseless and vibrationless operation.

Descriptive Circular No. 301 describes A-B-B Mercury-Arc Power Rectifiers.

American Brown Boveri Electric Corporation

165 Broadway, New York, N. Y. Camden, New Jersey

922 Witherspoon Bldg., Philadelphia 842 Summer St., Boston 230 South Clark St., Chicago

AERA

# AMERICAN BROWN BOVERI

# Safeguard and Accelerate Traffic

Automatic Signals by providing proper spacing of cars or trains, reduce trip time and enable more cars to be operated with consequent safety.

Interlocking installations at terminals and at grade crossings eliminate unnecessary stops and assure route continuity by means of signal indications.

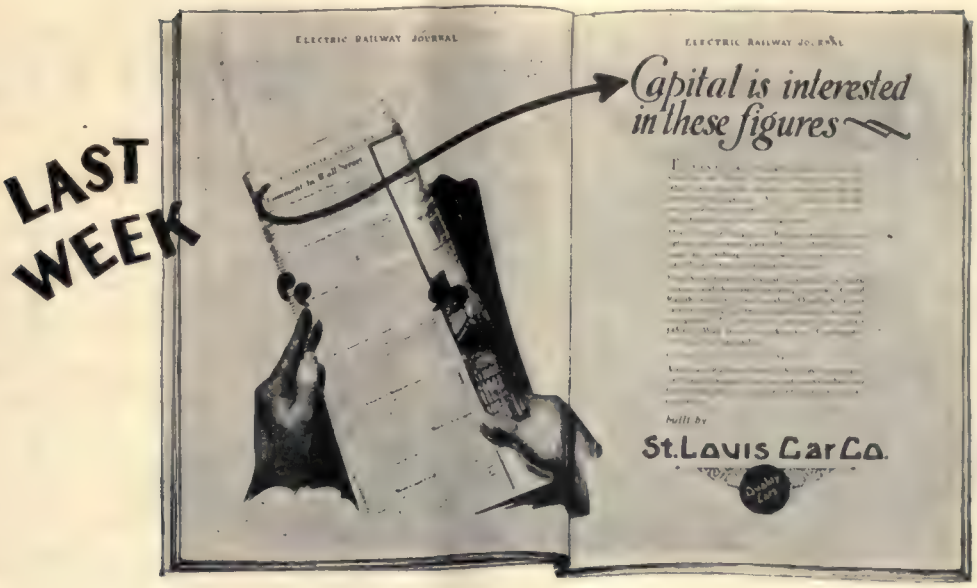
Highway crossing protective devices of the flashing light, automatic flagman, or audible type, or combination of same, are a dependable insurance which soon pays off the investment.

Power operated remotely controlled switches are being used economically to accelerate Electric Railway traffic.

*These Systems are products of the*

**Union Switch & Signal Co.**

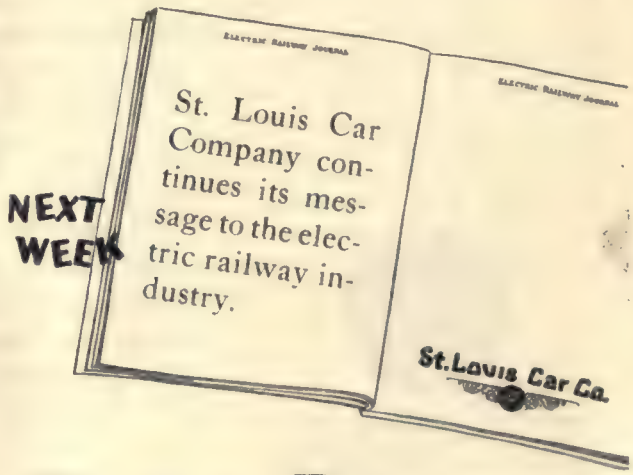
SWISSVALE, PA.




# Every week,

yes every hour, with every tick of the clock, the St. Louis Car Company has pledged itself to co-ordinate its every resource in fostering modernization programs, so as to expedite the already apparent "come back" of electric railways.

We realize keenly our responsibility to the industry, and are equipped with every manufacturing facility to fulfill our obligations.




# St. Louis Car Co.

Quality Cars

Again proper rolling stock has been fitted to local conditions. As to the earning power of these modern cars, let the figures speak. One-man operation was a success from the start, and the public has been well pleased.

# Light-weight cars have cut costs on the Penn-Ohio System

Ey replacing 54,000-lb. cars with modern one-man cars on its Youngstown-New Castle line, the Pennsylvania-Ohio Electric Company has effected savings that amount to a gross return cf more than 40% on the new-car investment —sufficient to pay for the cars in three years.

The new 37,000-lb. cars, which are G-E equipped, consume 2.76 kw. hr. per car-mile at the car as compared with 3.83 kw. hr. for the old cars—a 28% reduction. They have made a total reduction of 30% in the accounts they primarily affect: Equipment Maintenance, Power, and Platform Expense. Their modern equipment includes GE-265 Motors, K-35 Control, and CP-27 Compressors.

Improved car design can do much to attract more patronage and promote public good-will. The motive power must keep up schedule speeds and keep down maintenance costs. Bear in mind the success of G-E Car Equipment on many roads that are modernizing, and let G-E equip your lines.

**Comparative Operating Costs**
**Per Car-mile**

| | Old Cars (1922) | New Cars (1925) | Saving |
|---|---|---|---|
| Equipment | 5.44 cents | 2.65 cents | 2.79 cents |
| Power | 7.51 | 5.46 | 2.05 |
| Platform | 6.21 | 5.27 | .94 |
| Total | 19.16 cents | 13.38 cents | 5.78 cents |

330-22

# GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

*Volume* 69 New York, Saturday, April 2, 1927 *Number* 14

## An Alligator Meant Motion to the Pharaohs

STRANGE is the concatenation of events. Change is often kaleidoscopic. Even at the risk of seeming to be overzealous the urge is irresistible to call attention again to a week's news that brought forth the stories of the new Springfield car, the new cars for the Washington, Baltimore & Annapolis Railroad, the new car truck for the Chicago & Joliet Electric Railroad and in another field the announcement of a new type of sleeping car containing fourteen rooms with a bed in each.

Surely the world of motion seems to be emerging rapidly from the era of utility to that of luxury, and maybe that is as it should be. No longer does the phrase *magnum vectigal est parsimonia* hold true. It is just the other way around. Economy is no longer a great revenue. Money can be made by spending money. And the transportation industry is finding it out. People want comfort. An alligator is just as good as he was in the days of the Pharaohs for riding upon. That was the affair of the Pharaohs. But the terms good and bad indicate nothing positive considered by themselves. Just because reverence is due to Noah and his ark is no reason why the effort should be made to emulate him today. Yet unconsciously this has been done too often in the case of rolling stock.

The present day Sophists notwithstanding, times do change. Reasoning *à posteriori* from these and other events, the conclusion is inescapable that the railways in their equipment advance are crossing the Rubicon. One must still live before one can philosophize. But in transportation today one must philosophize if one is to live. In the light of recent events it does not seem sacrilegious to chant *te Deum laudamas*.

## It Has Penetrated to the Roots of American Life

HE WAS just a little chap, not more than twelve years of age. He was standing in the middle of one of the busiest streets in New York City. He represented the conglomerate type that is an integral part of our city life. On his face was an expression of responsibility far beyond his years. He was directing traffic at a critical time, and traffic was obeying every motion of his hand. There was no confusion. Rattling trucks, screeching taxicabs, clanging street cars, halted at his whistle. In his alert gestures and frail little body was the fruition of one of the greatest movements mankind has ever undertaken. He proclaimed better than all the screaming posters and reams of propaganda that the safety movement has penetrated to the very roots of American life.

Now let us glance Westward. Take the recent case of Albert Frick, the young salesman for the Public Service Company of Northern Illinois, whose life was prolonged for 108 hours through the devotion of more than a score of his co-workers who had been trained in the art of artificial respiration; their skill was made possible because safety had been sold to the company for which they worked. Did Albert Frick die in vain? Certainly not. His death set up another beacon that will dispel the gloomy idea that corporations are soulless; that their employees have no regard for life and limb.

The gasp of the dying man, "Press a little harder, boys," is a motto worthy of the safety movement. If it is obeyed the roots of the movement will not only be sustained, but there will come a time when the unsafe man or woman will be considered a menace to society.

The little boy at the corner, and Albert Frick; what powerful arguments for the doubter!

## Further Recognition of Need for Relief from Paving Obligations

RELIEF for electric railways from part, at least, of their paving burdens is a burning issue. So far five states—New Jersey, Connecticut, Massachusetts, Montana and Utah—have extended relief of this kind to the railways. In addition more than 50 municipalities also have granted such relief in whole or in part.

New Jersey is the latest state to recognize the need for relief for its railways from burdens to which they should not be subjected under the changed conditions of the present day. There the Legislature, as noted in the ELECTRIC RAILWAY JOURNAL for March 26, has just passed over Governor Moore's veto a bill to relieve electric railways of a large part of their paving costs by not requiring them to put down new paving around their tracks when municipalities pave. The companies, however, are compelled to repair paving for 18 in. on each side of the track when damage is caused by the operation of cars, but are not compelled to repair damage other than that caused by the cars.

Passage of the bill over the Governor's veto followed a hard fight. Virtually the same bill was passed by both houses last year, but was vetoed by the Governor. When the measure came up again this year some local officials went to the extent of running display ads in the newspapers attacking the bill. However, the bill was carried in both houses by a good margin and was passed up to the Governor. Immediately upon his veto, the bill was reintroduced into both houses and quickly repassed.

The passage of the measure, particularly under these circumstances, should have a salutary effect elsewhere. In New Jersey the issue was coupled with that of the preservation of the 5-cent unit idea on the lines of the Public Service Railway. True, the plea for relief was the plea of the railway in the interest of its patrons, but the public did not have to accept the company's

word alone. Rightly, the Board of Public Utility Commissioners as long ago as 1925 aligned itself on the side of the railways. The board then stated that paving obligations have no logical relation to present-day operation as conditions have changed since these obligations were imposed; that they must be considered in fixing the rate of fare, and are a factor in fare increases. The commission went on record to the effect that economies effected by modification of paving obligations more nearly to represent present-day conditions would help not only to maintain the 5-cent unit of fare, but would provide additional revenue toward the better upkeep and maintenance of equipment and in general make available funds for betterment of service and improvement of operating conditions.

These are the conclusions of the state regulatory body. It was a position not taken without due deliberation. Already the passage of the measure has attracted favorable attention elsewhere, notably in New York State, where the cudgels for similar relief have been taken up, notably by the Syracuse *Herald*, which characterizes the relief measure as essentially just. There should be no let-up by electric railways elsewhere in their efforts to secure relief similar to that obtained in New Jersey from conditions that are anachronistic under present-day conditions.

## Where One Man Is Better than Two

EVIDENCE continues to accumulate in favor of the one-man car. Not only is it a satisfactory substitute for the two-man car, but service on many properties shows that it is distinctly better than the two-man car. Some of the advantages were referred to briefly in an editorial in this paper for Feb. 19. In a paper read before the recent meeting of the Illinois Electric Railways Association R. F. Palmblade spoke along similar lines from his experience in Peoria and other cities of the Illinois Power & Light Corporation system. He points out that there is a positive decrease in accidents per unit operated when the one-man car is used. Of course, the cars must be equipped with the pneumatic and electric devices that have been developed to forestall man-failure and equipment failure, but these have become so nearly universal in their adoption that one scarcely thinks it necessary to call attention to them any more. In fact, these devices are being used on many of the cars specifically designed for two-man service.

Mr. Palmblade also pointed out once more that the one-man car, properly used, is a time saver. Since the operator does not share responsibility with another, he can proceed with his duties just as soon as he is satisfied in his own mind that he should, without waiting for signals. With the assurance given by the automatic safety devices, many seconds can be taken advantage of which in the aggregate will amount to many minutes in the course of a day. Many of us who have ridden on a street car to save time have listened to the traffic officer's whistle that caused a wait when a fraction of a second saved by the conductor in giving the signal or closing the door would have let the car move through on the previous signal, and have groaned inwardly at the waste of our own time, though we gave not a thought to the company's.

It is well for all those who oppose the introduction or extension of use of the one-man car to ponder well Mr. Palmblade's closing words: "Were it not for the one-man type of operation the public would be paying much more today for a street car ride and many transportation systems would long since have passed out of existence."

## Enter the Villain of the Piece

EVEN today on a goodly number of electric railway properties one will find being enacted the typical blood-curdling melodrama of the Roaring Nineties. The hero (Public Relations Department) woos the innocent lass (the General Public) with soft words and gallant gestures. But the wicked villain (Claims Department) grasps the curly locks of our heroine in his vile paw and makes away with her. Ensues a battle royal between hero and villain, with the hero, alas, not always triumphing in the end, according to glorious tradition.

So the standards of the local utility stage must be elevated. Our heroes cannot be allowed to suffer ultimate defeat—it is too unsettling to audience morale. No, the villain in the piece must be given his just deserts, even as he snarls his memorable line "The Public Be Done."

Of what avail the honeyed phrases of the public relations department—its persuasive assurances that its sole desire is to deal in an eminently fair manner with each and every member of the public—when the individuals charged with administering claims settlements are fairly bristling with a "try and get it" air?

The car of a passing motorist is caught between a street car and a coal truck and squeezed into a shapeless and unbeautiful hulk. Possibly the claims investigator will call on the disconsolate owner and assure him that by no stretch of the imagination could the railway company be blamed for the unfortunate occurrence; probably the motorist will be completely ignored. At any rate he is indisposed to let the matter drop and pocket the loss himself, so he writes to the public relations department in the belief that from *this* quarter he will be assured fair consideration. Public relations asks claims about the case and is informed that even though the company may be at fault it would not be "expedient" to arrange a settlement unless the injured motorist actually files a suit. The hands of public relations are tied, so it either writes a letter of meaningless generalities or fails to reply at all.

In high dudgeon the motorist then retains a lawyer and files a suit. Quite as a matter of routine the claims department then waits upon the attorney for the complainant and grudgingly dickers for a settlement. The car owner has won his contention without bloodshed, but must split the amount with his lawyer, so that half of the cost of repairing his automobile probably devolves upon him anyway. When next he reads in the friendly little publication of the transportation company of the great efforts being made to render 100 per cent service and insure cordial relationships with the public, does he believe it? Alas, gentle reader, he does not.

A little public relations psychology injected into the activities of the claims department would make a world of difference on properties where incidents similar to the one just described are all too frequent. Nor does it mean that any claims should be paid unless they are just ones. It is the treatment the claimant receives that counts. A knocker can tear down more good will than ten boosters can build up. On every large city system there is bound to be a considerable number of accidents. Is it good business to develop a first-class

knocker out of every individual who comes into unpleasant contact with a reactionary claims department? Let's scrap the villain in the first act and make the local "drammer" a thing of beauty and a joy forever.

## Practicing Penance in East St. Louis

LENTEN mortification has been assuaged in East St. Louis, Ill., with the East St. Louis Railway and subsidiaries playing the rôle of moderator. Beginning on Sunday, March 6, and each Sunday until Easter, each city passenger paying a 10-cent cash fare is given a free return trip coupon. On the interurban cars coupons valued at 10 cents are given upon payment of each regular cash fare and can be applied at that value toward the purchase of a return ticket. The reduction is in effect on Sundays only, and in compliance with numerous requests the courtesy has been extended to cover the hours of morning and evening church services.

Although, with the attendant advertising needed and the actual transportation costs, the company will find itself out of pocket an appreciable amount, still even before the advent of mi-carême, the possible revenue loss had been more than compensated for in letters of commendation, newspaper comment, pulpit approval and general good-will publicity.

But granting that many Laodiceans were in need of just such stimulation as a reduced fare or a free return, who would then deny the efficacy of this novel plan? Seemingly unalluring inducements have a telling effect sometimes, although the tale is seldom told.

Aside from the ethics of incentives to attend church exercises and the commentaries on the possible diversion of the money saved through this plan, the railway is to be commended for its co-operation and contribution to the penitential program. It is another instance of the changed status of the utility in sensing the needs of its patrons and in tangibly supplying such wants. In helping its patrons "to carry on" in Lent, perhaps the railway is doing a service more far reaching than it contemplated!

## The Safety Car Duckling Growing Into a Swan

IN THESE days, when a posy thrown in any direction is pretty sure to hit a de luxe trolley car, let us not forget that in many cases this pleasing development was made possible by that ugly duckling the automatized, light-weight safety car.

Born of the dire need for economy, the safety car with its exposed carlines and slat seats could not make claim to that comfort and beauty which create patronage by stimulating the desire to ride an attractive vehicle. Its first job was to cut down costs; its second to hold or recapture business through greater frequency. Those jobs were done so well that hundreds of properties were able to keep their heads above water through all the awful struggles of post-war price increases and personal car expansion.

Now that this phase of the industry is past, electric railway operators are finding that the time is opportune to take the further step of producing transportation of a quality that has something more than mere utility. People use their personal cars not because they have to but because they like to. The present effort is to secure the same viewpoint for the public conveyance. Of course, that can never be 100 per cent possible, but when we consider the increase in the habit of riding brought about by the automobile and the great difference in cost between private and public transport there is plenty of business in sight for cars designed to attract it.

In view of the varieties of de luxe cars coming forward, it is pleasant to observe that the Stone & Webster organization, which did so much pioneering with safety cars, has encouraged its operators and its car specialist, C. O. Birney, to adapt themselves to the needs of the new ride-selling era. The Birney safety cars on various Stone & Webster properties today, with their cushioned seats, treadle doors, rich illumination, bright interior trim and exterior treatment in combinations like red, white and gold, afford a striking and happy contrast to their bareboned predecessor of the war and post-war periods. The duckling hatched under grim necessity shows promise of becoming a beautiful swan.

## Manufacturers of Tools Are Missing a Great Opportunity

NOW that the time has rolled around for securing exhibition space at the annual convention of the American Electric Railway Association at Cleveland next October, one is tempted to review the list of exhibitors at last year's convention, having in mind the very few tool manufacturers who have availed themselves of this medium of acquainting the industry with the value of their products with respect to servicing buses.

With the ever-increasing sale of buses as an auxiliary transportation for railway utilities, the need for proper servicing grows daily. Investigation reveals that in instances too numerous to mention the railway companies operating bus lines are at a loss to make emergency or general repairs due to lack of the proper tools. That these tools are being manufactured for every class of bus goes without saying. On the other hand, very few bus operating companies know that the right tool for the right job is available, which brings up the all-important subject of proper exhibits at a convention which attracts practically the entire personnel of the industry.

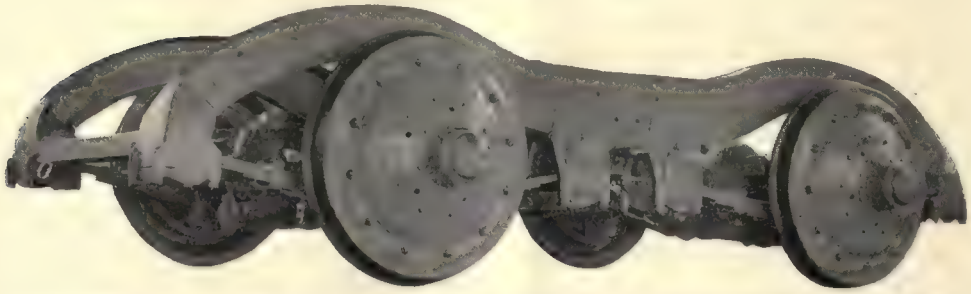
It appears to the JOURNAL that an exhibit of these tools is highly important and will be of mutual benefit to the railway companies and the manufacturers. It is one thing to have a fine stock of tools adapted for all purposes of repair and quite another thing for them to repose unexploited upon the shelves of the manufacturer. A golden opportunity is being missed in this respect, and in a spirit of absolute disinterestedness the JOURNAL suggests that tool manufacturers join the big parade in order that every one concerned may profit by physical inspection of their wares.

As illustrative of the value of showing a tool for every purpose and every job, one prominent member of the American Electric Railway Association was high in his praise of the Annual Maintenance and Construction Issue of the JOURNAL, basing his remarks upon the improved equipment section, which illustrated a wealth of tools and devices of inestimable value to the industry. This gentleman expressed the opinion that a section of this kind not only would give the master mechanic a splendid idea of the tool, and create a desire to possess one in his shop, but it would benefit the manufacturer in one of his greatest problems, i.e., making the purchaser visualize the usefulness of the tool.

## Joliet Develops

# Worm-Drive Trucks to Reduce Unsprung Weight

**Complete departure from conventional design is expected to reduce noise, cause less wear and tear on the car and track, and increase riding comfort**

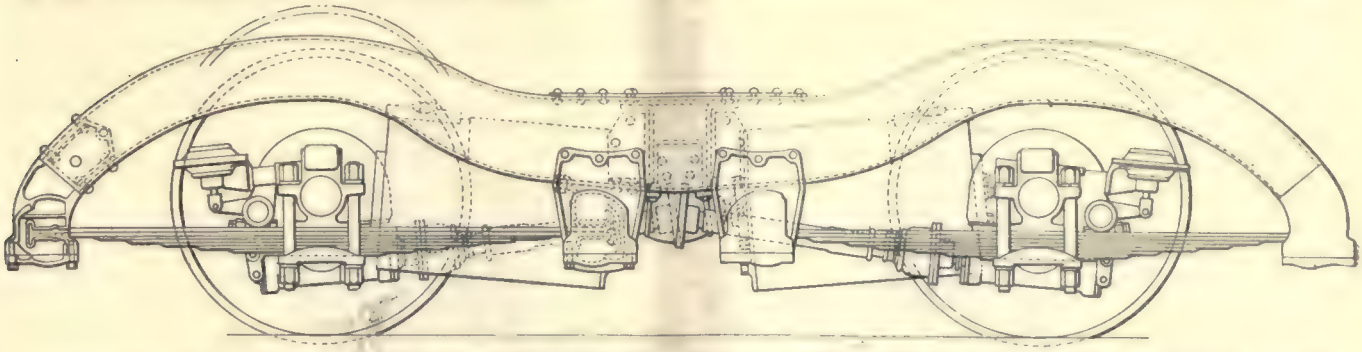


Reduction of unsprung weight, elimination of noise, smaller weight and operating economy were the objectives in the Joliet truck design. Although still considered in the light of an experiment, this departure from customary railway practice is based on the application of design features which have proved successful in heavy-duty automotive vehicles

A very simple type of construction is obtained in this application of automotive axle construction to a street railway truck. The side frames are made of $\frac{5}{16}$-in. pressed steel. The bolster is likewise pressed steel, $\frac{3}{8}$ in. thick

FURTHER radical departures from conventional design are incorporated in a pair of sample worm-drive street car trucks completed for the Chicago & Joliet Electric Railway by the Timken Detroit Axle Company. This development is the outgrowth of a conviction in the mind of J. R. Blackhall, vice-president and general manager of the Joliet property, that an entirely new standard of street car performance is needed to meet the demands of present-day conditions. As in the case of the experimental trucks for Springfield, Mass., an account of which was published in last week's issue of ELECTRIC RAILWAY JOURNAL, reduction of noise was one of the principal objectives sought. This seemed to dictate a design which would provide driving gears fully inclosed, protected from dust and immersed in oil. It also seemed clear that unsprung weight must be reduced to a minimum by carrying the driving motors on spring-suspended members of the truck framing rather than directly on the car axles. This is expected to reduce wear and tear on both equipment and track, while at the same time reducing those noises attributable to the pounding of the conventional construction over joints and special work. A gear reduction of 8½ to 1 is used. The effect of the large gear reduction made possible by worm drive is cumulative in the design, since it permits the use of comparatively light, high-speed motors giving necessary driving power with a large saving in weight. One truck completely equipped with two Westinghouse V-91-B motors having a one-hour rating of 35 hp. and with brake apparatus weighs only 5,328 lb. This weight reduction, together with the probable increased efficiency for frequent stop service resulting from the high gear ratio, is expected to show a considerable economy in power consumption.

Several railway and automotive manufacturers col-

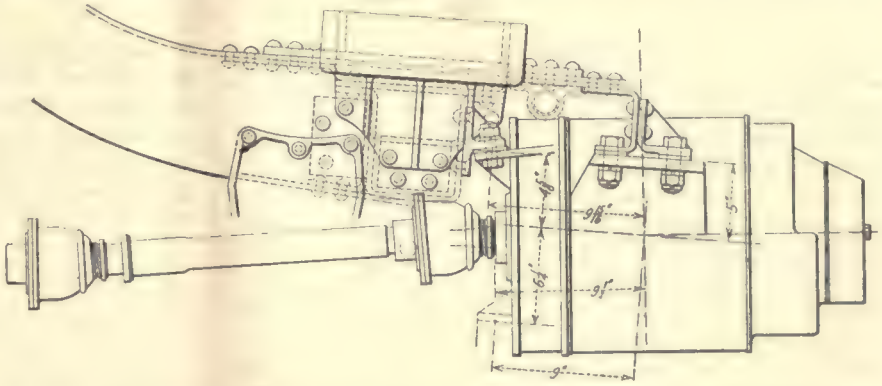


Half-elliptic springs on the Joliet worm-drive truck are carried in Masury rubber shock absorbers mounted in cast steel housings on the truck frame. A fixed pressed steel bolster is used

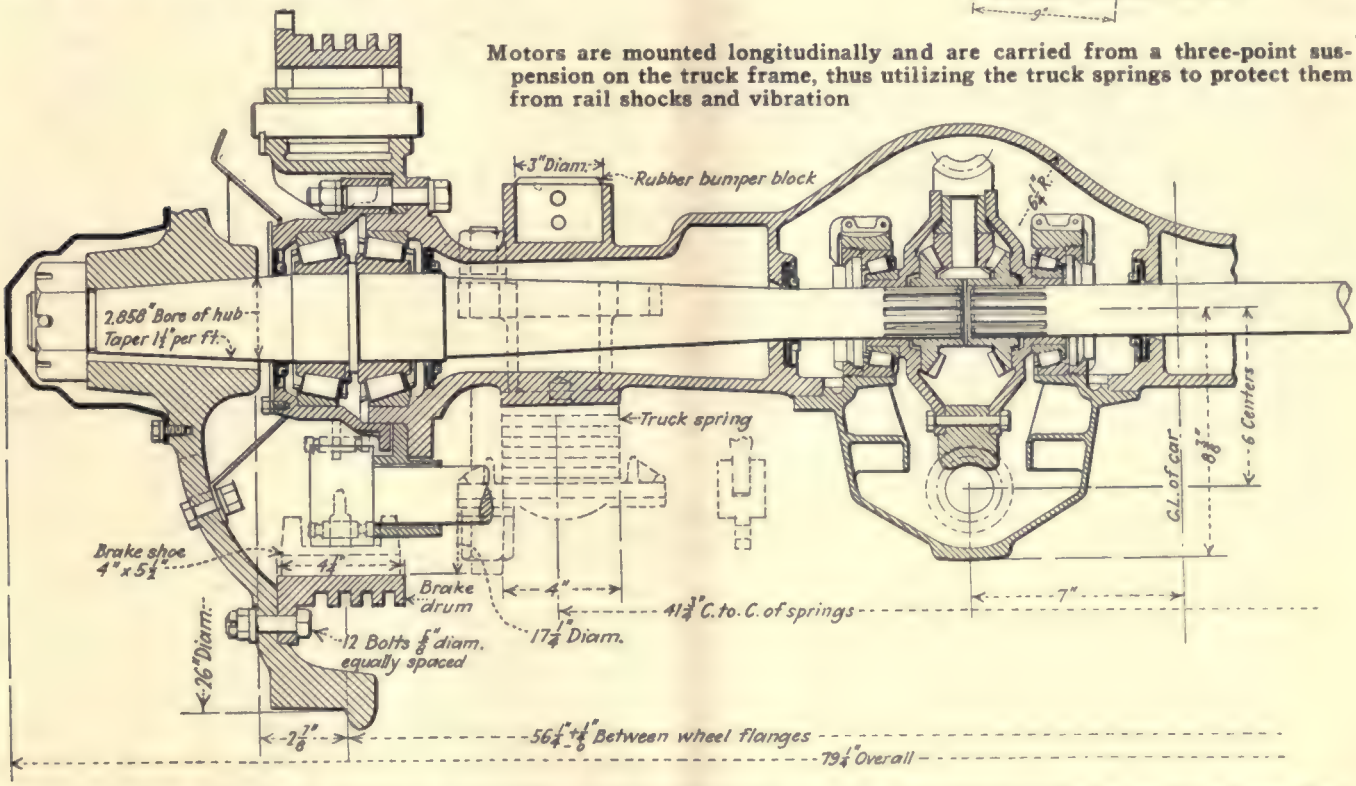
laborated with Mr. Blackhall and the Timken Detroit Axle Company in the truck design and construction. These include the Westinghouse Electric & Manufacturing Company, the Westinghouse Air Brake Company, and A. F. Masury and C. Froesch of the International Motors Company, who co-operated in the spring mounting design. Special section rolled-steel wheels were furnished by the Standard Steel Works. The pressed-steel side frames and all other pressed-steel parts were made by the Inland Steel Products Company. Although the trucks for Springfield, Mass., and the Joliet design are similar in many respects, they differ in several important features. A fixed bolster is used in the Joliet truck, the frame is of different design and the gear reduction is 8½ to 1 instead of 10 to 1 used by Springfield.

A specially designed body of combination wood and Duralumin is being built by the Cummings Car & Coach Company. This will be 45 ft. 1 in. long over all, 8 ft. 6 in. wide and 11 ft. ½ in. extreme height. The body will be arranged for one-man, two-man, double-end operation with automatic rear exit doors and will seat 51 passengers. It is estimated to weigh 14,000 lb. with all equipment. This will make the weight of the car complete with double trucks and four motors approximately 24,600 lb.

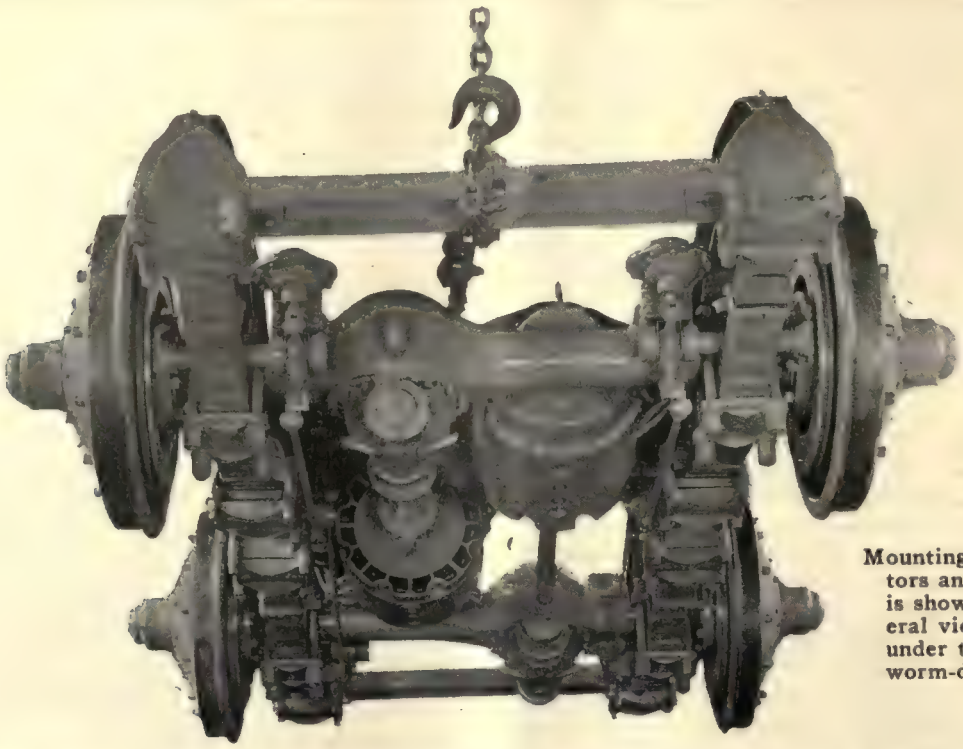
The worm-drive axle is not new in principle but is an adaptation of construction features which have been successfully used on heavy-duty automotive vehicles. It is of the underslung worm, fixed-hub type. The housing



Motors are mounted longitudinally and are carried from a three-point suspension on the truck frame, thus utilizing the truck springs to protect them from rail shocks and vibration



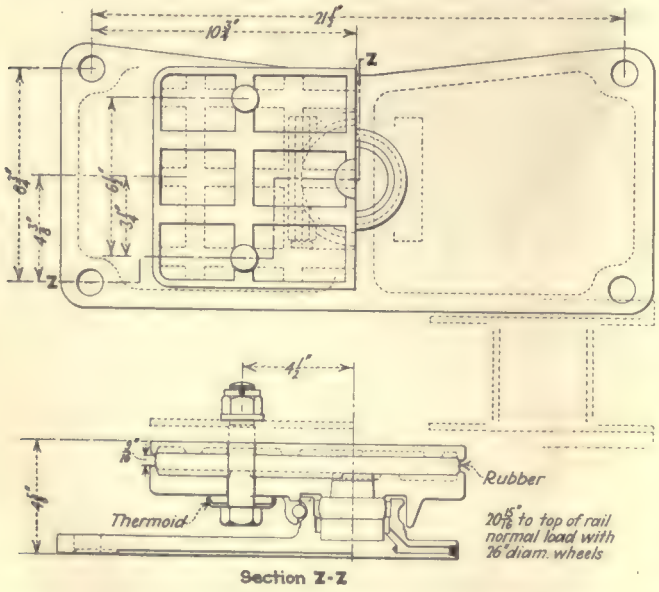

Cross-section through the Timken worm-drive car axle shows the special dished wheel section which reduces the overhang at the wheel bearing. The underslung worm has a clearance of 4 in. to the rail



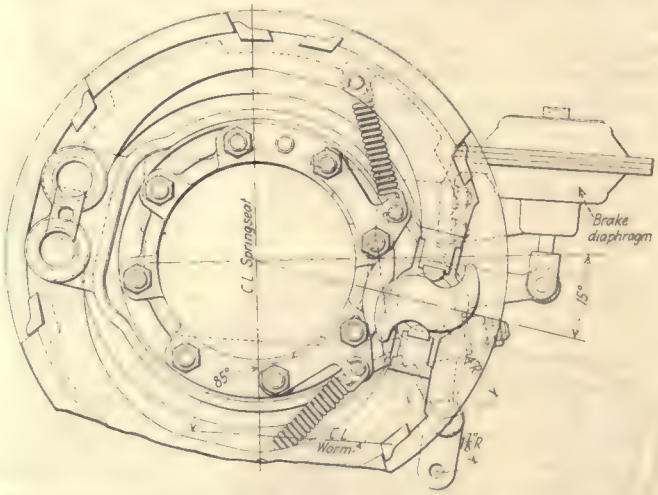
Mounting of the motors and drive shafts is shown in this general view looking up under the new Joliet worm-drive truck

is a one-piece steel casting with the worm carrier bowl offset from the center so as to permit the motors to be offset in the truck, driving in each case the far axle by a short driveshaft connected through two Spicer universal joints. Spring seats for the 4-in. wide half-elliptic truck springs are cast integral with the axle housing. The axle shafts are made of heat-treated alloy steel, designed with a large margin of safety for the calculated loads. Compared with the conventional automotive shaft the spline end is quite small in proportion to the load end. This is for the reason that the maximum torque that can be exerted is considerably less than in automotive practice because of the relatively small coefficient of friction between steel wheels on rails in comparison with that obtained on a rubber-tired vehicle.

Customary factors of safety have been considerably increased in the sample truck. A 3-in. axle diameter is used in place of 2⅝-in., which has proved satisfactory in heavy-duty vehicle practice under the same loading. By the use of dished steel wheels a still further improvement is made over automotive practice. With the conventional fixed-hub automotive axle it is customary to have a considerably overhung load on the wheel bearings because the small inside diameter of the rubber tire does not permit dishing the wheel to bring the center line of the tire in line with the wheel bearing. In the Joliet car axle the dished wheels materially reduce the overhung load and the only serious bending stresses expected are those due to thrust on curves.



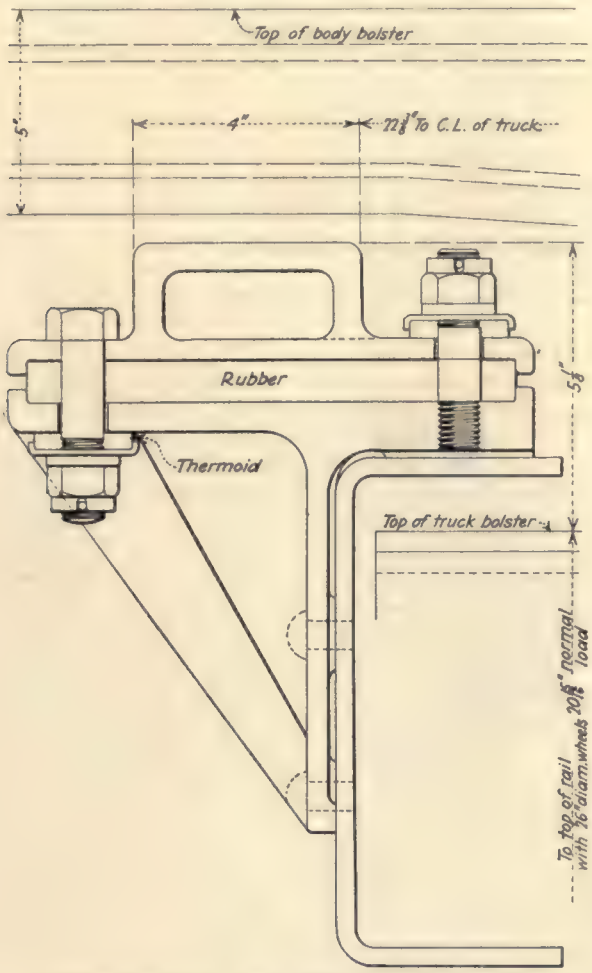

A rubber pad to absorb vibration and noise is used at the center bearing




Westinghouse automotive type brake diaphragms are mounted on the axles adjacent to each wheel. The brake drums are bolted inside the special wheels and have a diameter of 17¼ in. The effective braking surface is almost four times that obtained in automotive vehicles

The wheels have a taper fit on the axles and are held in place by a nut on the end, covered in turn by a protecting cap. Clearance under the worm housing is 4 in. to the rail. Westinghouse automotive type brake diaphragms are carried directly on the axle housings and are connected through the brake mechanism to the internal expanding shoes at each wheel. The brake drums are 17¼-in. diameter with 4-in. face. They are

bolted to the inside of the wheels and have fins turned on their outside surface to improve heat radiation. There is $\frac{7}{16}$ in. of effective wearing metal to insure long life before renewal is necessary. Two brake blocks are used on each shoe, having an area 4 in. x 5½ in. Almost four times the braking surface ordinarily provided on buses is thus obtained. Comparisons of weight per unit of brake block surface on present cars and buses with




Rubber pads are used under the side bearings to deaden sound

that on the experimental trucks gives an expectancy of between 75,000 and 100,000 miles per set of blocks.

Side frames of the truck are made of $\frac{5}{16}$-in. pressed steel in channel form, proportioned to carry the loads and give necessary stiffness. The fixed bolster is made of ⅜-in. steel, pressed into the form of a deep pan, with a cover plate of the same material riveted in place. It is attached to the side frames by gusset plates. Rubber pads of special design are to be used between the bolster and the center bearing to reduce noise and vibration and to improve riding.

Four-inch semi-elliptic springs of automotive type are securely clamped by bolts under the spring saddles provided on the axle housings. At their ends these springs are carried in Masury rubber shock insulators mounted in special cast-steel housings on the truck side frame, as shown in accompanying illustrations.

The motors are securely carried on three-point suspensions in the truck frame, so that they are fully protected from vibration and shock through the truck springs. They are wound for 300 volts and are permanently connected in series in pairs of two, for operation on 600 volts. Series parallel control is obtained by treating each pair of two motors like a single motor on an ordinary two-motor control car. The mounting is so arranged that the motor may be readily dropped out of the truck for quick replacement or repair.

Use of automotive type air brakes permits a very simple and workmanlike brake rigging construction which is expected to eliminate much of the rattle attributable to the customary type of street car foundation brake rigging. Adjustment for wear on brake blocks can be conveniently made through an adjustment nut on the brake application shaft. The equipment is arranged so that a hand brake can be conveniently attached. It will be arranged so as to apply the brakes to only one truck from each end of the car. This is considered ample to hold the car on a grade.

Although the new trucks are such a wide departure from customary practice as to make many features of the design experimental in nature, experience with this type of construction in automotive practice indicates a reasonable expectancy of low maintenance and long life. It is claimed that 500,000 miles of life is not uncommon for this type of axle in heavy-duty automotive practice, and that 1,000,000 miles should be obtained under the reduced loads and shocks encountered on street cars. On the basis of an average annual mileage of 40,000 this would give a 25-year life.

## Largest Electric Locomotive in Europe

CLAIMED to be the most powerful in Europe is an electric locomotive of the Berne-Lötschberg-Simplon Electric Railway which began service July 22, 1926. There are six driving axles, each driven by two Westinghouse twin motors with quill mounting. Each twin-motor group has a one-hour capacity of 700 hp., making the total capacity of the locomotive on this rating 4,200 hp. The one-hour tractive effort of the locomotive is 22,600 kg. and its starting tractive effort is 34,-

The latest Simplon-Loetschberg locomotive is said to be the most powerful in Europe

000 kg. Its normal speed is 75 km. (47 miles) per hour and it is capable of hauling a trailing load of 586 metric tons up a grade of 2.7 per cent at a speed of 50 km. (31 miles) per hour. The weight of the locomotive is 135.5 metric tons, of which 68.5 tons represents the electrical part and 67 tons the mechanical part. The length of locomotive over all is 20.2 meters or 64 ft. 4 in. The drivers have a diameter of 53¼ in.

Energy is taken from the overhead system at 15,000 volts, 16⅔ cycles.

# Electric Locomotives Stand Up Well in Service

**After Nineteen Years Operation St. Clair Tunnel Equipment Is Available for Service 97.7 Per Cent of the Time, with Low Maintenance Costs**

NINETEEN years ago the St. Clair tunnel of the Grand Trunk Railway, now the Canadian National Railways, between Sarnia, Ontario, and Port Huron, Mich., was electrified with the single-phase alternating-current system at 3,300 volts. Speaking before the heavy electric transportation class of the Westinghouse Club, Walter D. Hall, superintendent of the tunnel, gave an interesting account of the service that has been performed by the equipment in that time, a portion of which is given in the following abstract.

The electric service was inaugurated in 1908, with six 67½-ton Westinghouse Baldwin electric locomotives. In 1908 these locomotives made 154,392 miles, hauled 288,516 cars weighing 9,231,500 tons. Last year, 1926, these same locomotives made 248,025 miles, hauled 468,760 cars weighing 19,696,708 tons.

In the nineteen years since these locomotives were first operated they have hauled 6,617,590 cars, 268,917,150 tons and made about 3,934,010 miles, an average of 655,660 miles per locomotive; during all these years there is not a total of one hour's delay charged to locomotive failures, and in their nineteenth year, 1926, they were available for service 97.7 per cent of the time; time not available being made up as follows:

| | Per Cent |
|---|---|
| Changing wheels, mostly due to soft tires | 0.57 |
| Electrical, changing armatures, etc. | 0.57 |
| Mechanical, equalizers, brake rigging, pinions, etc. | 0.33 |
| Hydrostatic and hammer tests and other tests for government reports | 0.63 |
| Derailment damage | 0.20 |
| Total | 2.30 |

The average cost of maintenance per locomotive-mile over the entire period was 9.45 cents. Last year, 1926, this cost was 6.21 cents per locomotive-mile, cost per car-mile 0.659 cent, and cost per ton-mile 0.015 cent.

The locomotive auto-transformers have been rewound once and the commutators of the traction motors were renewed once. The fields of all motors have given practically no trouble. Five air compressor armatures have been repaired, but there has been practically no trouble with the blower motor armatures. Controllers and wiring have required only proper inspection and care. Three or four preventive coils have failed and practically all the union joints in copper rods from these gave trouble at some time, apparently due to the piece of fine copper gauze used in them; the gauze perishes and leaves a loose joint.

The pinions and gears have done remarkably well. Some pinions have exceeded 200,000 miles when removed. Some of the original gears are still in service, having made about 655,000 miles.

The frames of these locomotives are rigid from end to end and on account of the many curves encountered in the terminal yards wheel mileage has been low; on account of sharp flanges experiments were made with oil and hard grease applied in various forms, but without success.

At that time, 1910, the yard engine tires were making about 42,000 miles between turnings, and a maximum of about 250,000 miles, which meant a lot of time lost over the pit as well as a big expense. Realizing the seriousness of the situation, Mr. Hall and one of his foremen rigged up an old lubricator body with spray nozzles, similar in principle to an atomizer, so that the engineers could spray oil onto the wheel flanges when approaching curves by pressing a contact button at any of the controllers. This was so satisfactory that some of these tires made more than 150,000 miles between turnings and a total of more than 300,000 miles. The bearings of these locomotives have given practically no trouble.

### Improvements Made in Overhead Lines

Strain insulators began to blow up during wet weather and it was found that due to a slight movement having taken place in the insulator, or perhaps due to expansion, the ends had cracked and soot and acid from steam locomotive gases were washed into these cracks during rain storms; this difficulty was overcome temporarily by making shields of sheet fiber which were wrapped around the insulators, allowing the shield to extend beyond the ends about 8 in.

As opportunity presented other insulators were installed, but even with these some difficulty was experienced when hauling heavy ore trains beneath them with steam locomotives; the exhaust gases and moisture would short circuit insulators and result in a ground to the bridge structure; this trouble was overcome by placing two insulators in series a sufficient distance apart to prevent gases emitted from the locomotive stacks striking both at the same time.

In the tunnel were 480 insulating devices which supported two trolley wires from parallel messenger cables. The insulating medium was about 6 in. of impregnated wood. The two messenger cables were supported on barrel-type porcelain insulators. Apparently due to unequal expansion and contraction, the barrel type insulator would sometimes crack, and during damp weather the 480 wood insulators allowed sufficient leakage to blow up the line. An average of eleven short circuits per year resulted from this cause and some danger was present at all hours during the night or day. The wood insulating devices were assembled with hexagon-headed bolts and hexagon nuts and were very difficult to get at even with a box wrench.

To overcome this difficulty 480 insulating supports were made of ⅛-in. x 1-in. strap and standard 10,000-volt pin-type insulators. This was in 1915, and since that time there has not been a single failure, although the barrel-type insulators continue to crack, and sometimes sections even break away and fall to the floor of the tunnel. In this device bolts square under head and square nuts are used so that they can be easily and quickly removed from the line.

## Emergency Service at Montreal Completely Motorized

ALL horses of Montreal Tramways, Montreal, Que., used in the past for construction activity and assisting in maintenance of overhead lines, have been sold. Motors have taken their place. The company's stables on Cote Street are now in process of demolition. Car storage tracks will replace the building. Thirty horses comprised the company's equine fleet, grandsons and great-grandsons of the source of power for the old-time horse cars in Montreal. They were all in good shape and brought good prices when they were sold.

# Buses and Cars Give Co-ordinated Local and Express Service

*By George H. Harris*
General Manager Key System Transit Company, Oakland, Cal.

**Key System Transit Company has reduced running time between Oakland and Berkeley by five minutes. The fare is the same for both types of service, with free transfer**

Express car and local bus in the co-ordinated service recently established by Key System Transit Company

USE of buses in conjunction with street cars, not as feeders, but along the same route, providing local service and leaving the tracks for express service by cars, is being tried by the Key System Transit Company, Oakland, Cal. This railway serves a metropolitan area populated by some half million persons. Consequently on a number of long car routes rapid transit is desirable. Most important of these are the routes between Oakland and Berkeley, which are separate municipalities, but in reality form one large community.

Three car lines operate between the downtown districts of the two cities, via College Avenue, via Telegraph Avenue and via Shattuck Avenue, the two latter running on Telegraph Avenue to a point some 40 blocks from down-town Oakland where Shattuck Avenue branches to the left and, later swinging to the right, becomes Berkeley's principal business street. The Telegraph Avenue line, which is a little longer between the two business centers than is the Shattuck Avenue line, was chosen for the experiment because it is a direct run between the campus of the University of California and the rapidly growing business district on the Oakland side of the campus. From a point a block distant from the campus it veers to the left to rejoin the Shattuck Avenue line in the heart of the Berkeley business area. Traffic on this route is exceptionally heavy.

### Fewer Stops Recommended

Steps which led to the plan now in operation are interesting. Two years ago, in the interest of better service to the public, a survey of the traffic situation was made by a committee of three composed of representatives of the California State Railroad Commission, the city of Oakland, and the railway. This committee recommended the establishment of feeder bus lines in various parts of the city, reducing the number of car stops from 13 or 14 per mile to eight and consideration of some form of express service to outlying districts.

After the two first recommendations had been carried out attention was directed to a study of the third. Express bus service between Oakland and Berkeley was first considered and an application was filed for per-

Passengers enter at front and deposit fare in Johnson box

At the rear a sizable well is provided to accommodate passengers leaving by the automatic rear door

mission to put it in operation on a 10-cent fare with the approval of the two cities concerned. Further study indicated that 10 cents per passenger would be insufficient, so the application was withdrawn and revised to call for a 15-cent fare. Meeting with the disapproval of the cities, this, too, was withdrawn. As a result of further consideration the system now in use was developed.

Buses are operated on a local schedule out Telegraph Avenue as far as Alcatraz Avenue, which is about two-thirds of the distance between the two business districts and is the approximate boundary line of the two municipalities. Telegraph Avenue cars operate on an express schedule of three stops to the mile as far as Alcatraz Avenue and then resume local operation. Shattuck Avenue cars run on the same schedule as far as Shattuck Avenue on Telegraph and there resume local operation.

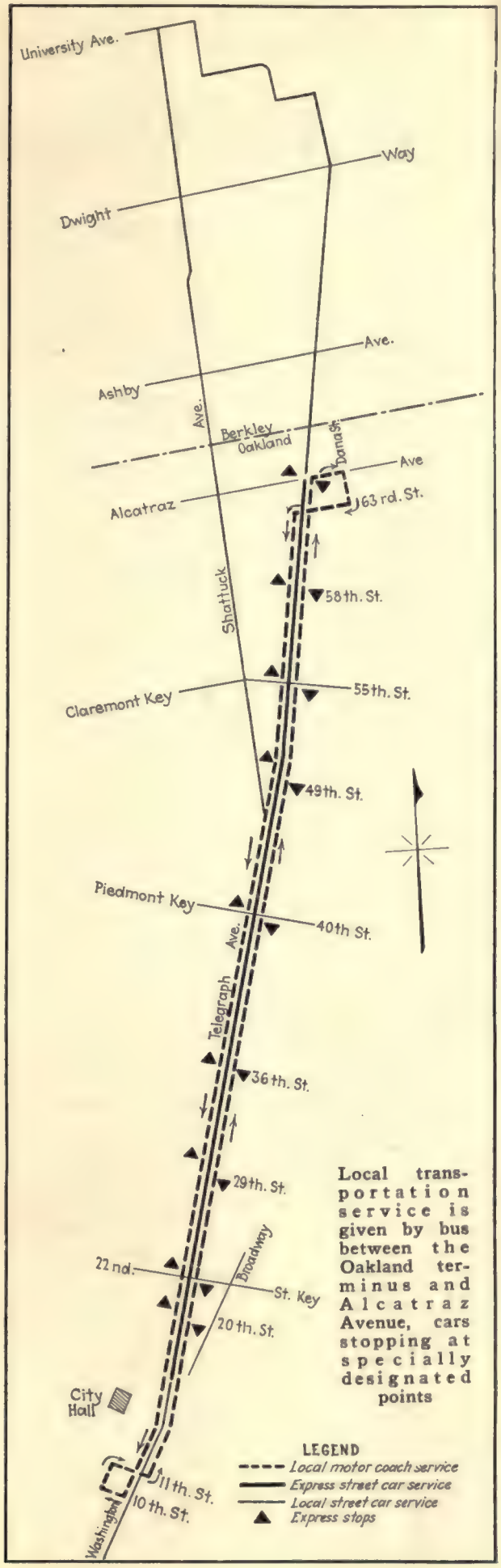
The fare for both buses and street cars is the same as in other sections of the cities—7 cents—and passengers boarding buses outside of the downtown areas, where the cars make regular stops, may transfer to cars at any express stop. Oakland-bound passengers on express cars may leave at any stop along the route provided they have boarded the cars outside the express limits.

The present express service on the Shattuck and Telegraph Avenue lines, respectively 5 and 6 miles long, saves from three to five minutes per trip between the business districts. Cars are operated on a ten-minute schedule and the buses every four, six, or 7½ minutes, depending on traffic conditions.

### Buses Have Automatic Rear Exit

For this service fourteen Fageol 29-passenger buses are used. The bodies are all steel and were designed by the railway's engineers. They are the front-

Passengers transferring between car and bus at an express stop




entrance, rear-exit, single-deck, pay-as-you-enter type. The rear door is controlled by a treadle step. In addition the rear door may be operated by compressed air from the driver's seat, the front door being similarly manipulated.

How successful this experiment will be it is still too early to determine, but the management is optimistic. If it proves as successful as is hoped this type of operation will be extended to other sections of the metropolitan area.

# Cincinnati Remodels Interior of Cars

**Electric Heaters and Cross Seats Installed in 21 Pay-as-You-Enter Cars—All Thoroughly Painted Before Return to Service**

INTERIORS of 21 double-truck pay-as-you-enter cars were recently remodeled by the Cincinnati Street Railway, Cincinnati, Ohio. These were manufactured by the Cincinnati Car Company and originally had longitudinal seats to accommodate 34 passengers. Replacing these with twelve cross seats, two longitudinal seats on one end of the car and one longitudinal seat at the opposite end of the car has improved greatly the interior appearance as well as providing additional

**Full-upholstered Spanish leather seats are a feature of the new equipment**

comfort for the passengers. The upholstering of these seats, which are of Hale & Kilburn manufacture, is in Spanish leather. The color creates a pleasing contrast with the mahogany stained interior finish and the cream headlining.

One Railway Utility Chromalox heater is installed under each cross seat and four are installed in the front vestibule. The cross seats are spaced at 31 in. centers and the seating capacity of the car with the new seats is 34.

The outside of the car is painted burning bush orange with cherry enameled sash, cream letterboard and cream window posts. A black stripe makes a very favorable appearance. Painting the trucks red and the roof slate gives a pleasing contrast of colors. Electric Service Supplies Company air-operated sand valves facilitate sanding. The remodeling of these cars was part of the 1926 reconstruction program.

# The Men Who Are Responsible for the *Annual Maintenance* of Electric Rail

SEVERAL new features were included in the annual maintenance and construction issue of ELECTRIC RAILWAY JOURNAL dated March 19. A maintenance notebook section began with this issue and will be continued in the monthly maintenance and construction issues to supply desirable information on maintenance practices for the men who are actually doing the work. A very complete section was devoted to improved devices and equipment for carrying on maintenance work. The new and special tools illustrated point the way to reduced cost and higher grade maintenance workmanship.

The articles in the issue were written by men who have made outstanding progress in the improvement of maintenance practice. ELECTRIC RAILWAY JOURNAL takes this means of thanking them for helping to make this issue so successful by contributing of their time to tell the electric railway operators the results of their experience.

That the industry appreciates the efforts of those who contributed to the issue is evidenced by the many letters received from electric railway maintenance men throughout the country. The following are extracts from some of these comments:

JAMES E. DOOLEY, master mechanic New Haven Division of the Connecticut Company, writes:

"To my mind the maintenance data sheets of the JOURNAL of March 19 are what all equipment men need, so let this good work go on."

H. E. WEYMAN, manager Levis Tramways Company, comments in part as follows:

"I would like to congratulate you on your maintenance notebook section, which I think will prove a real help to the industry. I assume it is your intention to include track and overhead maintenance data sheets and special tools developed for the work, which will be of considerable interest. Some of the special tools developed by railway companies are very good and should lead to further developments and improvements."

E. S. FITZ, operating manager Gulf States Utilities Company, Beaumont, Texas, comments as folows:

"Your new maintenance notebook section, started in the March 19 issue, appears to me to be a step in the right direction, since these sheets will be available for filing much better than clippings that many of us have been taking out of the JOURNAL in the past. Our organization, I know, will be glad to contribute to this department whenever we feel that we have some ideas that would be of benefit to your readers."

J. L. SMITH, superintendent motor coach department, Toronto Transportation Commission, says in part:

"I have read the maintenance notebook section in your March 19 issue with a great deal of interest and I think that a full set of articles along this line will be very valuable indeed to electric railway men."

CLAUDE BRYAN, engineer of ways Wilmington & Philadelphia Traction Company, says in part:

"I have read very carefully the issue of ELECTRIC RAILWAY JOURNAL of March 19. Your maintenance notebook section starting in this issue is a mighty good thing and I think it will prove very valuable to electric railway men."

From H. A. LEONHAUSER, assistant superintendent of rolling stock and shops the United Railways & Electric Company, Baltimore, Md., comes this letter:

"Your annual maintenance number containing the new maintenance notebook section, as well as the JOURNAL in its entirety, appeals to me very much."

J. B. CORDERMAN, master mechanic Lima - Toledo Railroad, Toledo, Ohio, says:

"I think your annual maintenance number of March 19 is fine. It is a real help to the shop men and is good for the management as well. Any property that is worth operating should be in good condition."

JOHN LINDALL, superintendent rolling stock and shops Boston Elevated Railway, says in part:

"Please accept my congratulations on the many timely and interesting articles contained in your March 19 issue of ELECTRIC RAILWAY JOURNAL. Maintenance men will undoubtedly read this issue from cover to cover. Your proposition to provide a maintenance notebook section looks good to me, as it will enable maintenance men to have such notes in convenient form for ready reference. More power to you in the good work."

E. K. MILES, superintendent of transportation New York State Railways, Syracuse, writes:

"Your issue of March 19 leaves nothing to be desired from a maintenance standpoint. The description and explanation of shop equipment was exceptionally fine."

J. E. COLLER, division superintendent Pittsburgh Railways, comments as follows:

"I have read most of your annual maintenance number and I think it is very interesting and useful, and I hope to follow up the suggestions made."

# Condition of Electric Railways Commend *and Construction Issue*

## way Journal

A. F. REXROTH, master mechanic Harrisburg Railway, says:

"Fine! I never saw a better number."

FRANK E. SHERIDAN, master mechanic Boulder Street Railway, Boulder, Col., says:

"I wish to compliment you on the various articles on high class maintenance in your March 19 annual maintenance issue. They are very instructive to the maintenance man."

D. L. FENNELL, superintendent of transportation Kansas City Public Service Company, writes:

"A very fine issue and in keeping with your high standards. I have read most of it with great interest. Why not have special issues devoted specifically to transportation practices, accident reduction, claims work and selling rides?"

D. E. BLAIR, general superintendent Montreal Tramways, says in part:

"Your issue of March 19 is very interesting. I would especially commend the maintenance notebook section. My experience is that most of the small repair shops around the country are equipped very badly in the way of reference data."

NELS C. RASMUSSEN, superintendent Wisconsin Valley Electric Company, Wausau, says:

"You struck the right idea. This certainly will be the best reference library that the operating men have ever had. Wish you luck in this good work."

HERMAN EICKHOFF writes from Philadelphia as follows:

"In conducting any business efficiently and progressively, it is absolutely necessary continuously to inform ourselves of what and how our competitors are proceeding and the ultimate results accomplished. Your annual maintenance number of March 19 gives just such information. I am sure that it is welcome to the great majority of your readers. Permit me to congratulate you upon the timely improvement."

W. J. SMITH, master mechanic Twin City Lines, Minneapolis, says:

"I was very much interested in reading the articles in your March 19 issue. Am sending a note to all the foremen in this department asking them to read the various articles."

HORATIO BIGELOW, superintendent of railway South Carolina Power Company, Charleston, writes:

"My compliments on your March 19 issue of the JOURNAL. I am pleased particularly with the maintenance notebook section. So often a problem arises, you remember a solution suggested in the JOURNAL, but it takes time to spot the article. The maintenance notebook will help in this regard. I suggest that comparative pull-in records and maintenance costs be included in this section, if possible."

J. W. HULME, assistant superinintendent of car equipment Interborough Rapid Transit Company, New York City, says:

"The maintenance number of ELECTRIC RAILWAY JOURNAL for March 19 was a big success and fills a much-needed want. I consider it the most progressive step the JOURNAL has ever taken."

A. F. TOWNSEND, local manager Northern Texas Traction Company, Fort Worth, Tex., says in part:

"We have received and read the annual maintenance number of the JOURNAL with a great deal of interest. This is a splendid edition and reflects a great deal of work and thought upon the part of those responsible for it.

"I think the notebook section, starting in this issue, is an advanced step in trade journal work, and will be of great value to the industry as time goes on."

NILES PERSONS, master mechanic Schenectady Railway, makes the following comments:

"I have read the March 19 annual maintenance issue or ELECTRIC RAILWAY JOURNAL with much interest and do not hesitate to say that it is one of the best issues I have ever read. I was particularly interested in the article and pictorial section of the new DeKalb Avenue shop of the Brooklyn-Manhattan Transit Corporation."

From P. W. J. SMITH, superintendent New York, Westchester & Boston Railway, comes the following:

"I think the March 19 issue was fine. The articles on proper maintenance had the kick that most of us need, and if followed properly should bring about considerable good to all departments. We obtained many good points from this issue from the experience of others."

R. A. BIRD, Portland Electric Power Company, Portland, Ore., says:

"Being a transportation man, I do not know much about the maintenance part of the business, but I enjoyed the March 19 issue of ELECTRIC RAILWAY JOURNAL very much and got a lot of valuable information from reading it."

J. W. KNECHT, superintendent Grand Rapids Railway, said:

"I enjoyed the March 19 issue of ELECTRIC RAILWAY JOURNAL very much. A maintenance issue always creates much interest among operating employees. The maintenance notebook feature is excellent and should be read by all equipment employees."

H. A. DAVIS, superintendent of railway Nashville Railway & Light Company, commented in part:

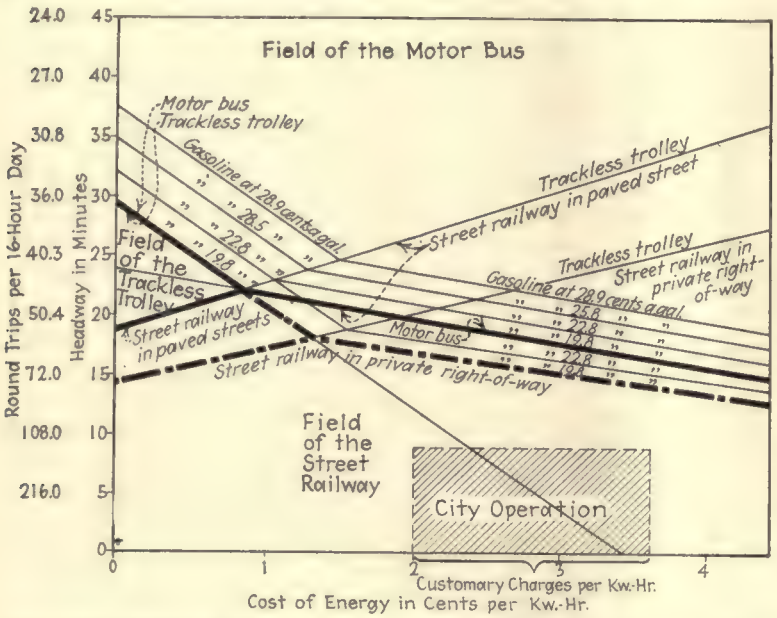
"Your annual maintenance number is a great step forward in solving one of the greatest problems any company has to contend with. I do not believe that we have yet awakened thoroughly to the realization that poor equipment inefficiently maintained will soon demoralize an entire organization—with disastrous results.

"It is equally important that each employee in the mechanical department know his job and be trained thoroughly in the performance of his duties, in order that unnecessary loss of time be eliminated. Old material and old and worn-out equipment help to demoralize the organization. Keep up the morale of your employees by keeping up the equipment, is my advice to any organization. We congratulate you upon this maintenance issue."

# Choice of Motive Powers in City Service

### Economic Merits of Electric Railway, Trackless Trolley and Motor Bus Operation Charted by Dutch Engineer

GRAPHICAL presentation of the conditions under which each of the three modes of city transit, namely, electric railway, trackless trolley and motor bus, would be the most economical under any given set of conditions has been essayed by P. M. Montijn of the Hague, Holland, Tramway company. In an article in *Verkehrstechnik* for Nov. 26 he works out the basic formulas. In doing this he has taken the costs of the various items as they apply in Holland, but explains that the method is applicable to other conditions if the constants used are changed to fit the particular problem considered. In converting Mr. Montijn's financial data and conclusions to dollars, the Dutch florin has been taken as worth 40 cents. His initial assumptions follow:




**This chart shows the fields of the electric railway, trackless trolley and bus under Holland double-track operation conditions**

$A_s$ = cost per mile of track, overhead line and feeders for street railway
- (a) single track in paved streets.....$22,400
- (b) single track over own right of way (including real estate)..... 32,000
- (c) double-track line in paved streets..... 38,400
- (d) double-track line over right of way..... 51,200

$A_t$ = cost per mile of overhead line and feeders for trackless trolley
- (a) single line with two overhead conductors.$14,080
- (b) double-track lines with two overhead conductors ..... 18,560

$i_s$ = interest and sinking fund on $A_s$
- (a) when laid in paved streets..... 8 per cent
- (b) when over private right of way. .... 7 per cent

$i_t$ = interest and sinking fund on $A_t$..... 9 per cent

$i'_s$ = interest and sinking fund on first cost of the street railway cars..... 7 per cent

$i'_t$ = interest and sinking fund on first cost of the trackless trolley buses.....12 per cent

$i'_a$ = interest and sinking fund on first cost of the motor buses.....16 per cent

$a_s$ = maintenance per car-mile in cents of track and overhead on the street railway.....0.9

$a_t$ = maintenance in cents per bus-mile of the trackless trolley overhead line.....0.5

$b_s$ = maintenance in cents per car-mile of the street railway car.....3.2

$b_t$ = maintenance in cents per bus-mile of the trackless trolley bus.....6.4

$b_a$ = maintenance in cents per bus-mile of the motor bus .....8.3

$B$ = first cost of a car or bus for 35 passengers (same for each of the three systems).....$6,000

$p_e$ = cost in cents of a kilowatt-hour ..... 2 to 3.6

$p_b$ = cost in cents per gallon of gasoline (or "benzine")* .....19.8 to 25.8

$c_s$ = kilowatt-hours per car-mile for the street railway .....0.8

$c_t$ = kilowatt-hours per bus-mile for the trackless trolley .....1.6

$c_a$ = gallons of gasoline per bus-mile for the motor bus .....0.17

$m$ = average distance in miles covered by each vehicle in a day.....109

Reserve rolling stock for time spent in shops and extra trips of 20 per cent is assumed for all three types of transit, although the author says that actually a smaller reserve would be required for the railway than for either bus system. The assumption is made that the street car will have a life of 30 years, the trackless trolley of twelve years and the motor bus of eight years, with an average daily performance for each of 109 miles as already mentioned. No charge for the use of the streets by the buses is included, but the railway track maintenance expense includes the paving charges paid at present by the Hague Street Railway.

From these data the author develops a series of formulas for the yearly cost of operation with each kind of motive power, and on the basis of these formulas two charts were prepared. One is for single-track operation and the other for double-track operation. The latter is reproduced on this page. That for single-track operation has a somewhat similar form.

In discussing the double-track chart the author points out that it shows that even with energy as low as 0.4 cent per kw.-hr. the field of the trackless trolley, as compared with the street railway, would lie only between headways of 17 and 26 minutes for the railway built over private right of way and between 20 and 26 minutes as compared with the railway laid in paved streets. Hence, even at this low cost of energy, the area of the field for the trackless trolley is so small and restricted that a slight change in the headway of the service given would throw the trackless trolley into the field of economic disadvantage. Of course with these long headways the railway would probably be single track, not double track, and the opportunity for the trackless trolley would be even less. Finally, with electrical energy costs at the usual figure of from 2 to 3.6 cents per kw.-hr. the choice really lies between the electric railway and the motor bus.

The author then discusses the fields of the motor bus and trolley and also calls attention to the rectangle in the lower right-hand side of the chart marked "City operation." It will be noticed that this rectangle includes all headways of less than nine minutes where

*The figures in this calculation are based on the use for fuel of benzine which is the customary fuel in Europe instead of gasoline. The word "gasoline" is used in the chart and elsewhere in this article so as to make the formulas more easily usable by American users.

electrical energy can be purchased within the limits of from 2 to 3.6 cents per kw.-hr. These are the customary rates in Holland, so that this area represents the usual conditions of city operation. The author points out that it is well within the area on the chart representing the field of the street railway. Still another advantage of railway operation, not shown in the chart because the chart is based on the use of single units only, is the railway's far greater adaptability to the operation of trailers.

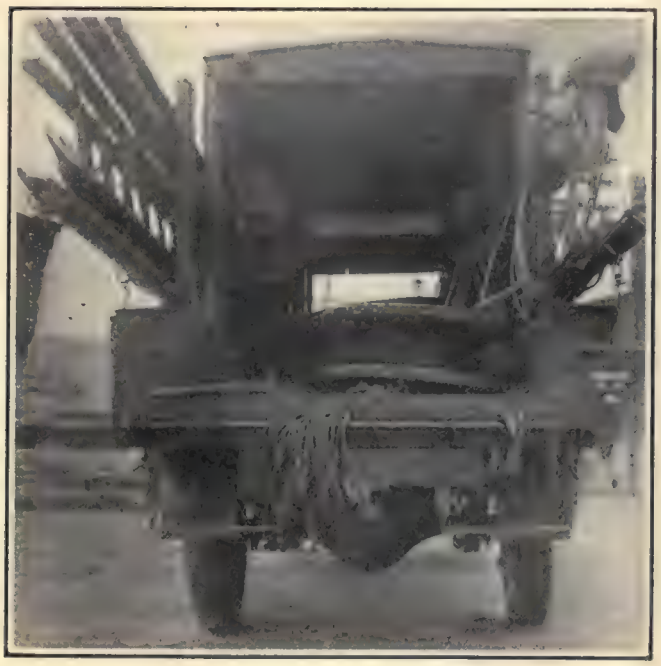
In conclusion, the author compares the results of his study with those reached by Victor Topping in an article in the ELECTRIC RAILWAY JOURNAL for Aug. 25, 1923. Although the basic conditions in the Canadian example discussed by Mr. Topping vary considerably from those in Holland, the conclusions reached by the two investigators are considered by Mr. Montijn to be not very far apart.

## North Carolina Public Service Builds Construction Truck

BELIEVING that a construction truck body containing certain unusual features could be built cheaper in the company's shop, led C. M. Seawell, master mechanic of the North Carolina Public Service Company, Greensboro, N. C., to design and construct such a body.

A General Motors Corporation truck chassis, model K-32, having a weight of 3,943 lb., was purchased. A semi-inclosed body made of well-seasoned oak timbers was erected on this chassis and reinforced with heavy angle braces, bolted securely to the chassis. The roof consists of ¾-in. pine boards fastened to 1-in. x 3-in. oak cross-beams and covered with heavy canvas, finished with several coats of paint to make it weatherproof. The flooring is made of 1-in. oak planking. Suitable drop curtains on either side of the body inclose the sides during inclement weather.

A multiplicity of strong hooks and racks inside and outside of the body provide for carrying all of the necessary working tools and equipment, such as ladders,



Rear view of truck showing rugged construction and spacious interior

Side view of truck designed and built by North Carolina Public Service Company, showing symmetrical appearance, tool boxes and method of carrying tools

rope and shovels. Spacious weatherproof oak tool boxes, extending the entire length of either side of the body as well as under the driver's seat, provide storage for additional tools and equipment. A 6-in. steel channel erected at the back end of the roof, and a similar channel installed on the chassis extension at the end of the floor provide a strong support for a chain hoist or a pole-lifting boom and gaff when required. The completed body weighs 1,200 lb. and the truck has a capacity of 8,143 lb. This truck, with its attractive appearance, spacious interior, complete tool equipment and speed, has met every purpose for which it was designed.

## This Advertising Should Draw

RAILWAY advertising in Australia has a new form. The railway stations on the Sunday suburban lines have earthen platforms built up to about the height of the floors in the car. These platforms run the full length of the trains and are usually finished with white gravel, little garden plots and ornamental shrubs, which are tended by the station staff. About a quarter of the space of each platform is under shelter for protection against bad weather, the remainder being open.

These advertising cabinets usually stand on the central platform of suburban stations and the advertisements can be seen by people waiting for trains or in passing trains, some of which stop at the station. The cabinets are of wood with a tiled roof and a little garden plat at the foot, with hanging baskets of ferns, etc. They are glazed, the glass being held by a nickeled frame, and have a stylish look. The advertisements are painted or on printed cards, which can be changed as desired by unlocking the glass frame, which swings out on hinges. The cards are narrow strips of various colors, with a good deal of small sign writing on them. the idea being that people who are waiting for trains will have time to read the small type, though people any distance away could not do so.

Most of the frames now are divided into four spaces on each side and rectangular cards, about 30 x 40 in. occupy each space. The colored designs behind glass look very well.

The advertisements are used mostly by the theaters and for sports meetings and other "topical events." Many of the people who work in Sydney live in the suburbs and a very large number of them travel by train, so that the advertisements reach a large clientele.

The advertising rights are let to an agency, which sublets to advertisers, and frequent changes of advertisements are the rule.

# Maintenance Notes

## Motors Rebuilt to 95 Per Cent Condition

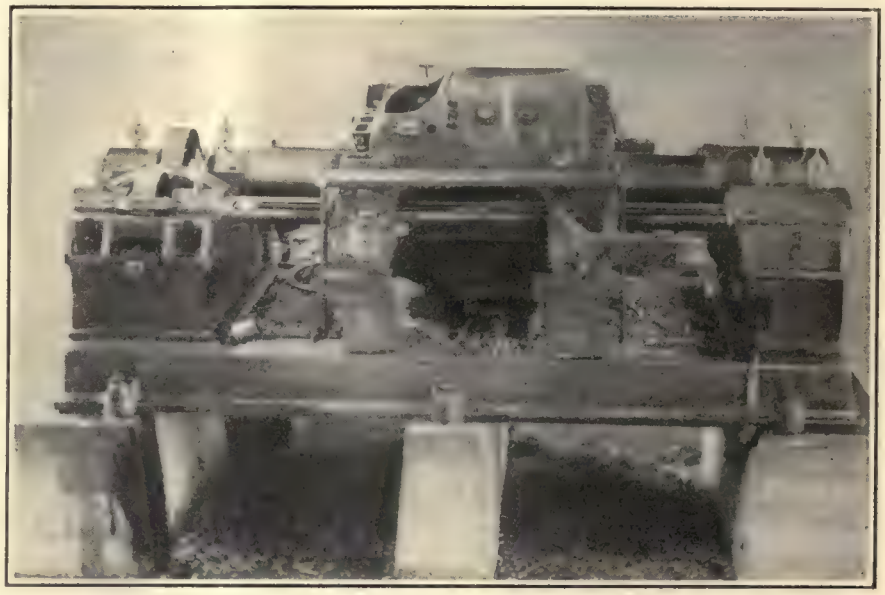
SPLIT-FRAME motors which have seen years of service on the Los Angeles Railway are so reconditioned in the shop that the machines, which are Westinghouse 306-L, are comparable with new. Armatures are completely rebuilt, shafts straightened and bearings refinished. The split frame requires considerable reconditioning. The adjoining faces of the two halves are built up by electric welding and then planed off so that the frame when finished is exactly the original size and shape.

The two halves are bolted together, with 0.006-in. liners between, and placed on a double spindle boring mill, which machines the fits for axle bearings and armature housings. These openings are bored to ⅛ in. oversize. It is necessary to furnish oversize axle bearings and armature housings to fit the reconditioned motor case.

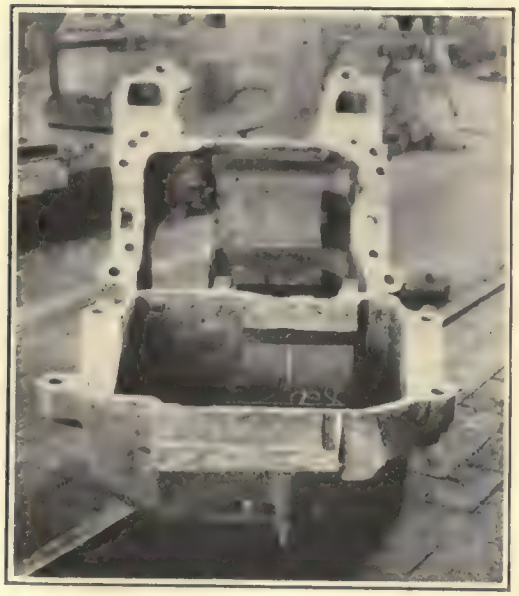
After the case has been finished Rico automatic oilers are fitted to armature bearings and axle bearings. Installation of this type of oiling equipment is standard on the property as this type of motor goes through for reconditioning.

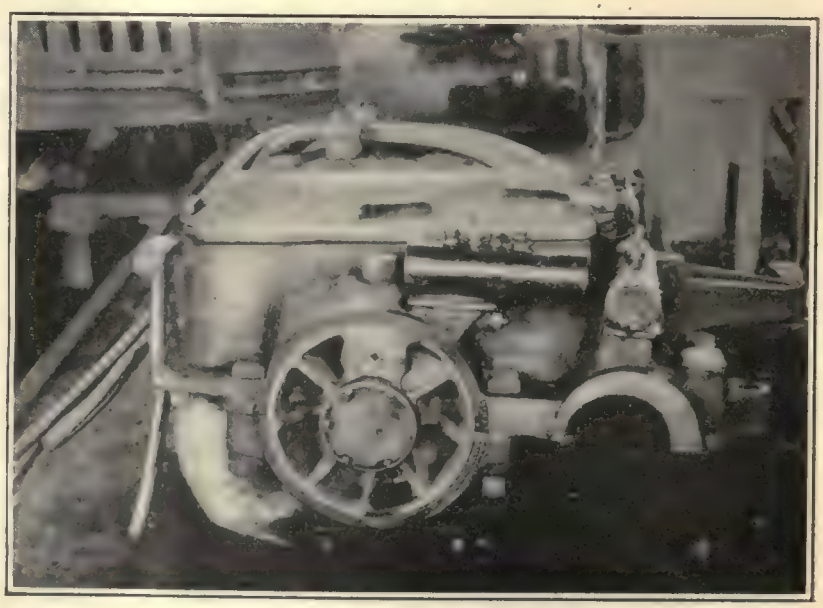
The machine on which the case is bored was constructed in the shop to do this particular job. It is small, compact and simple. This latter feature is made possible with the split case to be bored. The spindles which carry the boring bits revolve in large bearings. These spindles are driven by a worm gear from a small electric motor mounted at one end of the machine. The four cutting bits are held in collars, each driven by its shaft through a single spline, in which is the feed screw. Both right and left hand threads are cut on these feed screws, one-half of the length being cut with each. This makes it possible to feed both cutting tools from the outside of the work to the center with one feed screw. A five-pointed star carried on the end of the feed screw serves as a pick-up for advancing the tool into the work. A dog on the frame of the machine engages a point of the star pick-up every time the main boring shaft makes a revolution.

Particular attention was paid to obtain approximately the same cutting speeds of the tools working on



Motor cases being reconditioned in Los Angeles have openings for axle bearing and armature bearing housing bored on double-end horizontal boring machine





At left, split-frame motors have joints built up by electric welding and then refinished by planing and boring. At right, completely reconditioned No. 306-L split-frame motor with Rico oilers on armature and axle bearings

the large diameter cut, or the armature housing, and the tools cutting the small bore, or the axle bearing. The larger bore is 11⅝ in., while the smaller is 5⅞ in. Therefore, the boring bar working on the axle bearing opening was to run at twice the revolutions of the armature bearing housing boring bar. The feed screw for the smaller boring bar is ⅝ in. with eleven threads to the inch, while the other is ¾ in., with ten threads to the inch. As the length of bore for the smaller hole is approximately twice that of the larger hole, the machine takes care of itself automatically once it is started.

In setting up the machine a disk carried at the center of the large boring bar is clamped between the four pole pieces of the motor case. This centers the hole for the armature bearing housing accurately with the large boring bar. The small boring bar is aligned by raising that side of the case by small jacks. After final alignment the case is clamped to the base of the machine. These clamps are clearly shown in the accompanying illustration of the machine.

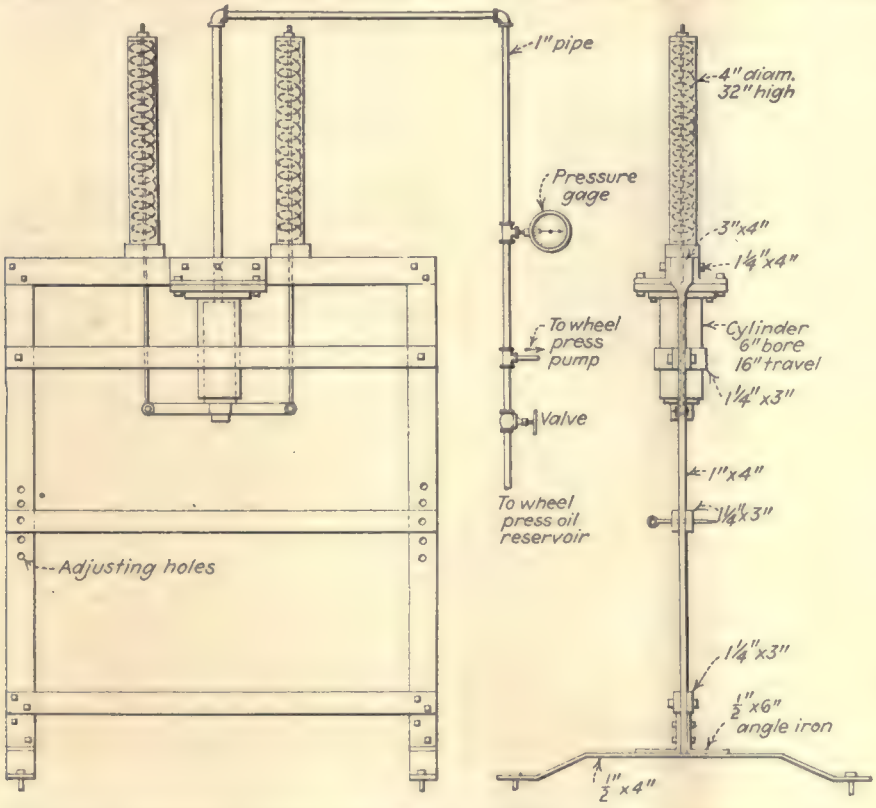
*Don't be a "pacifist," but be "prepared."*
*Keep your "snow fighting" equipment repaired.*

# Armature Bearing Press Operated by Oil Pump from Wheel Press

PRESSING out armature bearings was a very slow and tedious process in the shop of the Southern Public Utilities Company, Charlotte, N. C., until the master mechanic, W. D. Osborne, designed and constructed a hydraulic press in the shop.

This press is operated by the oil pumping equipment of the wheel press. The framework consists of two uprights of 1-in. x 4-in. steel bars that are tied together by steel bars 1¼ in. x 3 in. and 1¼ in. x 4 in. These cross bars are horizontal and are bolted to the uprights. A pressure cylinder having an outside diameter of 12 in., an inside bore of 6 in. and a 16-in. travel is fastened to the two 1¼-in. x 4-in. top cross braces. Two 1¼-in. x 3-in. steel bars encircling the circumference of the cylinder, one on either side and fastened to the uprights, act as steadying clamps for the cylinder. When the pressure is released from the cylinder the ram is returned to the release position by two 3½-in. diameter coil springs, 32 in. long, which are incased in a cast-iron cylinder. Each of these springs is connected to the ram by means of a ¾-in. round iron rod passing through the center and connecting with a ½-in. x 2½-in. clamp fastened to the ram. These connecting rods are threaded on one end and are provided with a nut to permit of adjustment. A 1-in. pipe line between the armature bearing press cylinder and the wheel press pump has a valve mounted near the armature bearing press, which allows for a gradual pressure application. A gage in the pressure line indicates the pressure being applied.

Each upright is drilled with five adjusting holes to allow for the raising or lowering of the tailstock bars to take care of various sizes of armature bearing heads. The press framework is fastened to two ½-in. x 4-in. U-shaped brackets by means of ½-in. x 6-in. angles. The press is designed to have a maximum capacity of 30 tons.




Hydraulic armature bearing press used by Southern Public Utilities Company, Charlotte, N. C.

## Aluminum Covering for Stanchions

By H. S. Williams
Assistant Superintendent of Equipment Department of Street Railways, Detroit, Mich.

MAINTAINING iron pipe stanchions on the older cars has been an annoying problem for many years. No paint has proved adequate to protect them, and complaints from passengers and crews regarding rust getting on clothing have been most annoying. The Department of Street Railways of Detroit has recently developed what seems a very effective plan for overcoming this difficulty.

Not wishing to go to the expense of replacing the stanchions on old cars that are near their time of retirement with aluminum or a vitreous enameled pipe and yet being desirous of securing a non-rusting stanchion, the practice has been adopted of slipping a piece of thin aluminum tubing over the old iron pipe. This aluminum tube has a 0.022-in. wall and is just the right diameter to slip over the old stanchion. The old fittings are retained, but before the aluminum tube is placed the outer end of the threaded part is chamfered with an ordinary burring reamer just sufficiently to give a socket effect to receive the end of the tubing. This furnishes a finish to the tube and assists in holding it tightly when the fittings are in place. The fittings are painted

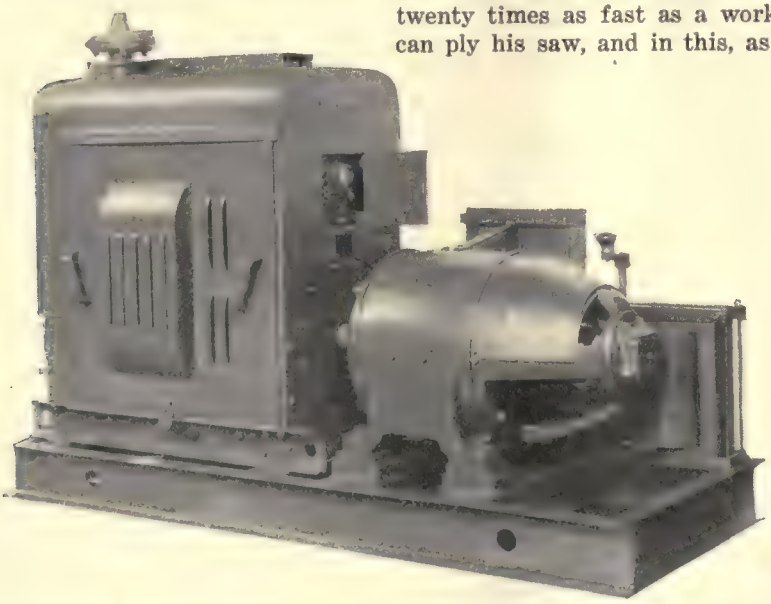
with aluminum bronze. It is not necessary to cover any part of the stanchion except that coming in contact with the passenger's hands. Short sections may be covered, if desired, a collar being used at either end to hold the tube and give proper finish.

# New Equipment Available

## Small Gas-Engine-Driven Welder

PARTICULARLY for shop and garage use where electric power is not available, a small gas-engine-driven outfit incorporating the WD-11 generator with a continuous rating of 150 amp., a one-hour rating of 200 amp. and a welding range from 50 to 250 amp. is announced by the General Electric Company, Schenectady, N. Y.

The generator is driven by a Continental P-20 power unit rated 18.22-hp. S.A.E. and capable of developing 23.5 hp. at 1,400 r.p.m. The generator is equipped with a control panel, rheostat and self-adjusting stabilizing reactor. The engine accessories include a strongly constructed radiator, pressure fed lubricating system with oil pressure gage and indicator, vertical tube gravity feed carburetor, air cleaner, centrifugal governor, starting crank, 10-gal. gasoline tank, tool box and sheet metal hood with sheet metal side panels which can be locked in place.



Shunt generator direct connected to a gas engine

Among the advantages of this combination are low first cost, light weight and reliability. It is stated that tests have shown the outfit capable of standing up under hard service and overloads. The set is mounted complete on a structural steel base so designed as to facilitate easy moving from place to place.

## Air-Driven Portable Hand Saw

FIVE times the work of an ordinary hand saw is the ability of a compressed-air operated portable saw devised by the Ingersoll-Rand Company, New York, N. Y. By a shift of blades, the pneumatic hand saw may be put to work in sawing wood, soapstone, Bakelite, wallboard, cables, copper and other materials. Cross-cut or rip blades for different types of work are available. It cuts timber, does trimming work on buildings and scaffolding and can be used by railroads in car repair work.

In sawing wood the portable air-driven hand saw can be operated twenty times as fast as a workman can ply his saw, and in this, as well as in all other work, it can be operated continuously without fatigue to the operator. Its weight is such that it can be carried about and handled easily by the workman. The 8-in. size weighs only 23 lb.

One outstanding feature of this new air saw is its safeguard against accidents. The design combines the Ingersoll-Rand three-cylinder type of air motor, long in use in I-R grinders and lightweight drills, with the Crowe safety saw guard.

The air-driven hand saw speeds work and reduces accidents

The safety guard is of a telescopic nature. It opens when the saw is applied to the material and it closes automatically and locks in position as the cut is completed. It affords complete protection against accident or damage to the blade. The saw guard has an adjustable stop so that the saw can be set for the required depth of the cut.

The three-cylinder air motor is of the balanced type, smooth running and free from breakdowns. All wearing parts, including the cylinders, are renewable. The cost of upkeep of this safety saw is almost negligible. It is being manufactured in three sizes, known as B6, B8 and B12 and takes 6-in., 8-in. and 12-in. blades, respectively.

## Joints Sealed Against Oil Leaks

PAINT which is said to seal effectively joints against oil leaks has been developed by the General Electric Company and is sold by its merchandise department at Bridgeport, Conn. The product, known as G-E No. 880 red protective paint, also prevents water and gas leaks. It can be used for many purposes that require red lead or white lead, and is less expensive than either.

The paint, which is dark red in color, requires no priming and can be applied by brushing or dipping. Denatured alcohol is used as a thinner. It dries rapidly and produces a hard, smooth, glossy film that is cleaned easily and that prevents excessive collection of dirt and conducting material, thereby decreasing surface leakage and subsequent carbonization of the surface when used with electrical apparatus.

# Association News & Discussions

## Car Maintenance and Shop Practices*

By J. D. Barnhart
Superintendent of Shops Illinois Traction System, Decatur, Ill.

UNTIL other means were provided, it was our practice to raise one end of a car with a stirrup attached to the hook of a 15-ton traveling crane and to move the trucks from underneath the car with pinch bars. This required the men to be under the car while it was suspended in the air, and as the weight of some of the trucks is as high as 30,000 lb. considerable time was required to do this work.

All our truck work is done on two parallel pits, each 150 ft. long and 16 ft. between centers. This arrangement lent itself quite naturally to the installation of an endless rope haulage system for moving trucks back and forth. This consists of an endless ⅝-in. steel cable, a driving engine, a tension adjuster, guiding sheaves, cable supports and a clutch.

The driving engine has a base of structural steel on which is mounted the brass bearings for the drum and gearing shafts. Two drums, 24 in. in diameter, are grooved for passing the cable three times around in the elliptical arrangement to obtain sufficient friction for driving. The driving power for operating the drums is furnished by a Westinghouse D-2-EG compressor motor driving through a triple reduction gearing so as to move the cable no faster than 20 ft. per minute.

### Details of Drive

The tension adjuster is made up of two 12-in. stationary sheaves and an adjustable sheave which is anchored to a fixed position by a screw that takes up the slack as the tension demands. The driving engine is located in a pit between tracks at one end of the car pits and the tension adjuster is located in another pit at the other end. The cable is located 28 in. below the top of the rail and 3½ in. from the face of the pit walls on the near sides of the two parallel pits. It is far enough below the trucks so that there is no interference. Four 12-in. sheaves are used at the four corners where the cable passes out of the pits. At distances in the pit of 6 ft. hard wood blocks with grooves cut in them are used to support the cable.

A steel bar with a cable grip which can be closed or released with a lever serves as the connecting link between the truck and the cable. The controller for operating the motor is located in a small pit between tracks and midway between the ends so that the operator is as close as possible to the truck being moved and the man giving signals for his guidance.

Another outfit which has proved worth while at our shops is the air lift used for removing and replacing compressors. Up to the time of the installation of this lift it was our practice to crib up under the compressors, which weighed as high as 1,600 lb., and spend from an hour and fifteen minutes to an hour and 30 minutes of four men's time in removing and replacing one of these compressors. With the lift two men can remove and replace a compressor in twenty minutes. The lift is located under the near rail of the track at a point opposite the door to the air brake department. Four 8-in. x 12-in. cylinder bodies bolted together in pairs are mounted on a 10-in. supporting concrete wall, one pair on each side of the wall. Two cylinders are used on account of the height of lift required.

The lift is sunk in the ground so that it does not interfere with the traffic over the track. In using the lift it is necessary to remove a 4-ft. section of rail and its supporting sill. When these pieces are removed the top of the lift table is about 10 in. below grade. A concrete ramp 7 ft. long extends from the floor of the air brake department to the table of the lift and a roller bearing carriage 4½ in. in height is provided for moving the compressors over this ramp from the track to the air brake department, or vice versa.

Our babbitt furnace includes two 1,000-lb. pots set side by side in a cast-iron top that rests on the brick walls of the coke burning furnace. A hood over the pots connects with the furnace flue and provides a means of escape for the fumes from the pots. One of these pots is used for melting babbitt and the other for the tinning alloy. Our babbitt furnace does not have the automatic control, yet the babbitting of our armature bearings has been uniformly successful.

### Thin Babbitt Lining Used

We have our own brass foundry and cast our own armature bearings, so that we babbitt both new and worn bearings. New bearings are made special for each armature. The babbitt lining is limited in thickness to $\frac{1}{16}$ in. and as the armature shaft journals vary, it is necessary to make the bronze shells special for each motor. One-sixteenth of an inch is the limit of wear allowed on armature bearings and a greater thickness of babbitt is not needed; in fact, it is not desired, for with too thick a lining of babbitt it would be possible, should a hot bearing develop, for the armature to get down on the pole piece and be ruined before the hot bearing was discovered. The boring of the babbitt lining is also special for each bearing; the bore is made 0.012 in. larger than the shaft diameter.

While the bearing shell is still warm from the tinning process it is placed in the jig for babbitting. This jig is a device for centering the mandrel in the bearing shell. The gate, which fits the bearing opening closely, is clamped in position and the tapered steel mandrel, heated to a point just below that at which water sizzles on it, is painted with a solution of graphite and water and put in place. The bearing is then ready for babbitting. When the temperature of the shell is held at a sufficiently low degree it is not necessary to block the chinks around the gate, for the babbitt solidifies immediately on passing through these crevices. A self-skimming ladle of sufficient capacity to pour a bearing without stopping is used.

In the machine shop the bearings are bored out for the particular journals they are to fit and the oil grooves cut in them. Except for the GE-69 motors, we have found that these bearings pressed into the frame heads are ready for service without any additional work done to them. When bearings are

*Abstract of paper read before the Illinois Electric Railways Association, Springfield, Ill., March 17, 18, 1927.

### COMING MEETINGS OF *Electric Railway and Allied Associations*

*April 4*—Birney Club, regular meeting, Missouri Athletic Club, St. Louis, Mo., 6:30 p.m.

*April 13-14*—National Automobile Chamber of Commerce, meeting, Chicago, Ill.

*April 20-22*—American Society of Civil Engineers, spring meeting, Kenilworth Inn., Asheville, N. C.

*April 26-29*—Southwestern Public Service Association, convention, New Orleans, La.

*April 27-29*—American Welding Society, eighth annual meeting, Engineering Societies Building, New York City.

*May 6*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

*May 31—June 1-2*—Canadian Electric Railway Association, annual convention, Winnipeg, Man.

*June 6-8*—American Association of Engineers, annual convention, Tulsa, Okla.

*June 24-25*—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

*July 27-29*—Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.

*June 29-30*—Central Electric Railway Association, summer meeting, Book-Cadillac Hotel, Detroit, Mich.

*Oct. 3-7*—American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio.

pressed into the frame heads there is a slight corrugation of the babbitt along the window side of the bearing. A micrometer adjustment expansion reamer is run through these bearings after they are in the heads and the ridges of metal in the corrugations removed.

### Spray Gun System of Painting

The spray gun system of painting is now used at our shops for painting all classes of car equipment. Before adopting this method of painting, we learned that painters generally were not kindly disposed toward its use, so we broke some laborers into the use of the spray paint gun. When this apparatus was first put in operation considerable difficulty was experienced by the operator in getting a somewhat uniform coat and avoiding piling up paint and causing curtains and runs in the work. To overcome this difficulty a helper followed the operator and brushed out the paint with an 8-in. wall brush. However, as the operator became more experienced in handling the gun it was found that there were fewer curtains and it was not long till the helper's assistance was no longer needed.

As practically all our freight car work is done in the open, the freight car painting is confined to the summer months. The season extends through three months, and during this time two men, the spray gun operator and the stenciler, turn out on an average 100 cars per month. Flat cars, flat bottom and side dump coal cars, hoppers, box cars, express type trailers, refrigerators and cabooses are run through together.

In the last two years the adoption of the spray gun in applying lacquers to automobile bodies has brought to our painters the realization that they must learn the use of this new tool if they are to keep abreast of the times in their trade. When we decided to adopt the spray gun system of painting our passenger cars we brought to our shops an experienced spray gun operator and had him stay on the job a week to show the men the use of the spray gun in applying primer, surfacer, enamel and varnish to the cars. The great saving in time required for the various operations was a revelation to the men, and from the start they welcomed the opportunity to duplicate the feats of the expert. The men doing the spray gun painting of our passenger cars are old, experienced painters, who were accustomed to turn out a high-class job with the brush, and since they have proved to themselves that they can do as good a job with the spray gun in much less time the brush has been abandoned for work on the outside of cars except for color varnishing the sash. A comparison showing the time required and the amount of material used in the operations where the spray gun has been substituted for the brush is shown below.

The figures for the spray gun do not include the time required in filling the paint pressure tank nor the time required to clean the apparatus after it is used. When the same operation is carried out on a number of cars cleaning is required after the last operation only. Under any condition, however, three-quarters of an hour is sufficient time for doing this work thoroughly.

In this work no guards are used at the windows. It is much more satisfactory to coat the window lights with a good coat of glycerine, which, we find, can be removed more quickly with gasoline than with alcohol or a vinegar solution.

COMPARATIVE STATEMENT OF LABOR AND MATERIAL REQUIRED FOR HAND AND SPRAY GUN PAINTING

| | By Hand | | Spray Gun | |
|---|---|---|---|---|
| | Labor, Hours | Material, Gallons | Labor, Hours | Material, Gallons |
| Painting roof, one coat | 4 | 1½ | 1 | 2 |
| Applying surfacer, two coats | 8 | 2 | 3 | 2½ |
| Applying colored sealer, one coat | 6 | 1 | 1½ | 1½ |
| Enameling, one coat | 9 | 1 | 2 | 1½ |
| Varnishing, one coat | 9 | 1 | 2 | 1½ |
| Painting underframe, one coat | 9 | 2½ | ½ | 2½ |
| Painting trucks | 6 | 1½ | ½ | 2 |
| Total | 51 | 10½ | 10½ | 13½ |

# Track Maintenance*

By Jonathan Wolfe
Assistant Superintendent of Track and Roadway Chicago Surface Lines

OUR track and roadway department handles both maintenance and all renewal and construction work and is in charge of a superintendent of track and roadway with an assistant. There are four division superintendents, with a total of thirteen maintenance sections. In every division there are two construction gangs, each under a general foreman, these gangs handling construction and renewal work.

There are 31 switch cleaning districts, each taken care of by a switch cleaner reporting to the section foreman of his district. His duties include cleaning all switches and curves, testing mechanical switch protection devices, cleaning drain boxes and inspecting the tracks while riding between locations. These switch cleaners inspect every switch in their district daily.

Emergency men are kept on duty during the night hours at logical locations, the dispatcher reporting any trouble to the man located closest to the trouble, sending the emergency man to make the necessary repairs. When he finds he is unable to handle the trouble himself he calls out other men. If the track is dangerous for car operation, he stays there to flag the cars, having the train crew call necessary help to make the track safe until permanent repairs can be made.

The value of our power tools and equipment has increased 200 per cent in the last four years and we feel that we are entirely justified in carrying this large item because of the great savings accomplished. There is scarcely a machine which does not save its original cost in less than a year's time. The principal power equipments in use are as follows:

We use two sizes of air compressors. The larger unit, of 360 cu.ft. capacity, primarily for large construction jobs, mounted on a four-wheel rubber-tired trailer, operates eight tie tampers or four concrete breakers continuously. When breaking out concrete foundation this equipment, with an operator and four men, will do the work of 25 to 30 men. Each of our four track divisions employs these large compressors.

A smaller unit, mounted at present on a 1-ton truck chassis, operates four tie tampers or two concrete breakers. This equipment is valuable for cutting in rails to repair broken joints, renewing frogs, switches, etc., or for any work where paving or concrete must be removed on a small stretch of track. Being mounted on a truck, this equipment is moved quickly from one location to another and has greatly expedited maintenance repairs where concrete must be chipped out. We propose to add to this equipment for our work this year.

### Mixermobiles Place Concrete

For placing concrete we employ Mixermobiles, each mounted on a 1-ton truck chassis, the concrete mixer being run by the engine of the truck, having 20 hp. available. The levers on the Mixermobile are so arranged that they can be operated either from the driver's seat or from the ground. The capacity of the mixer is 7 cu.ft., one batch of thoroughly mixed concrete being made per minute. This mixer will not only handle the concrete required for rail cut-ins and small jobs, but will take care of large installations of special trackwork. We also use this machine on rail renewals, as the amount of concrete to be replaced around the base of the rails is not sufficient to warrant use of the large mixers.

For our extension and reconstruction work we use Chicago mixers mounted on cars and Drake continuous mixers, both running on the tracks, so that concrete can be placed as desired. With the Drake mixers we also use bucket loaders for raising the concrete materials from the street to the belt of the machine, these materials being spread beforehand in a continuous pile along the street.

We have also a large number of grinding equipments, all electrically driven, using for each class of work the type of equipment which we believe proves most efficient. For grinding electric seam-welded joints and electric welds on special trackwork, both manganese and high carbon, rotary grinders, with 7-hp. motors, of the Atlas type are used. For thermit welds reciprocating grinders of the Vulcan type give a smooth surface free from any hollows.

Electric hand grinders are used for grinding the throatways of manganese

*Abstract of paper read before the Illinois Electric Railways Association, Springfield, Ill., March 17, 18, 1927.

mates and frogs where one run is used much more than the other. Thus emergency curves, of which there are a great many, particularly in and adjacent to the Loop district, are kept in good operating condition. We never know when emergency operation may be started—a large fire or an accident in the Loop, a bridge out of service—any of these things may cause the cars to be rerouted, frequently with no advance notice given to the track department.

In each of our two frog shops we have a flexible shaft grinder which is proving valuable for grinding the welded throatways for flange bearing in shop-built frogs. These grinders are several times as fast as the hand grinders and do away with the necessity for bringing in larger grinders from the street.

### Rail Corrugations Ground

For the removal of rail corrugations we have six Kerwin grinder cars. All of these have been double-ended and 40-hp. motors installed to operate the double-ended machines efficiently. The subject of rail corrugation is one in itself and is being investigated thoroughly by a committee of the A.E.R.A., which recognizes the seriousness of it fully. Therefore, I will merely summarize our practice with regard to corrugations, which if not removed will destroy the entire track structure and greatly increase car maintenance costs. Some years ago these corrugations were on the increase, but by expanding our grinding equipment we have caught up with the corrugations, removing them when they develop to a stage that warrants grinding. In the last three years we have removed approximately 160 miles of single-track corrugation, the average depth being $\frac{1}{16}$ in. These heavy grinders are worked in sets of two or three, usually between temporary sliding crossovers placed a block or more apart, operating on two shifts, from 8 a.m. to 4:30 p.m., and from 8:30 p.m. until 5 a.m. When a street becomes corrugated we start at one end and work through by this method to the other end or as far as the corrugation extends. By speeding up the work in this way we reduce the interference with service to the public to a minimum and also do the work at a considerable saving in final cost.

Motor truck equipments for hauling materials and excavated materials have been increased rapidly and two years ago supplanted entirely the use of the slow and uneconomical teams and wagons on trackwork. Five-ton trucks are used for the heavy hauling, each equipped with a dump body. These trucks are also fitted with rail racks, so that in addition to other materials, rails can be hauled from the yard to the job. We also have some 4-ton trailers, used for hauling excavated materials, the trailers being placed on the job by the 5-ton trucks and later, when loaded, hauled away. Smaller trucks—1 to 3½-ton capacity—are used for lighter hauling. These trucks are also used for hauling the large air compressors, welding equipments, the use of the trucks being under the direct supervision of the track division superintendents.

For trackwork, electric boring and spike driving machines are used for the screw spikes which hold the rails to the ties. Hand work is done on only the smallest of jobs where there is insufficient work to warrant taking out the power equipments. Tie rod holes and fish plate holes, where required at cutins and special trackwork (these are normally drilled by the manufacturers) are made with Duntley track drills. One or more of these are in use on each division and at each of the frog shops.

We also have an asphalt road repair outfit, which is used to a great extent on maintenance work. During the winter this is used for heating concrete materials on small jobs and for special trackwork installations and at other times for heating asphalt for repairs alongside our right-of-way (we do not have much asphalt paving inside our tracks). Another use for this outfit is for heating natural rock asphalt that is being used to replace oak plank paving in crossings with steam railroads. Not only does this rock asphalt make a very considerable saving over oak plank, which in a railroad crossing usually lasts only from one to two years, but it gives a better paving and a safer one, as the danger of accidents is always present from loose or broken planks. This rock asphalt is easily laid and kept in repair and can be relaid when removed for crossing repairs. Plank pavings in grade crossings are being replaced by the natural rock asphalt on a slag foundation.

We also have larger power equipments, such as electric shovels, which are mounted on caterpillar tractors; a steam shovel, derrick or crane cars, supply cars, etc., which are used more or less for track maintenance, although primarily for construction work.

### Use Manganese Coated Electrodes

The electric welding of special trackwork, particularly on manganese steel, has almost unlimited possibilities. We started the use of high manganese coated electrodes (11 per cent to 14 per cent manganese) in 1921 and have been uniformly successful from the start. Due to the nature of manganese steel it is necessary to treat the welds while still red hot with cold water. Care must be taken to see that the part to be welded is cleaned thoroughly and, in addition to frequent quenching, peening the weld with a small hammer to remove scale before proceeding. Welds are ground to a smooth surface with an Atlas or other grinder. We are also using a special grade of coated rod for welding high carbon on battered shop-built frogs and rail ends that has improved our results on such work. Manganese welding alone has increased the life of our special trackwork several years, some of the original 1921 welds still being in service. We are now using approximately 9 tons of high manganese electrodes a year and have not yet reached the limit for producing savings.

# Wise Traffic Regulations Vital to Modern Communities*

By E. J. McIlraith
Staff Engineer Chicago Surface Lines, Chicago, Ill.

REGULATION of the use of streets and highways, and not merely the regulation of vehicles, should be the interpretation of the term "traffic regulation" which should create the greatest advantage or usefulness for the streets to the community. This does not always mean the greatest advantage to any one class or the greatest freedom of movement for the majority of the vehicles. It means, rather, that the purpose for which the streets are necessary should be served in the most satisfactory way. It means a variety of answers suitable to the various times and places.

### No Parking in Congested Areas

For instance, it is obvious that at least during rush hours busy thoroughfares, that are needed to capacity, should not be congested by parking or by slow service vehicles. It is also obvious that in a business district during most of the business day service vehicles must be able to load and unload express packages or make quick deliveries necessary to the conduct of business. However, it would be quite unreasonable for a warehouse or department store on the busiest streets to have trucks continuously loading or unloading at the curb so that the street and sidewalks would be largely or almost entirely blockaded by such use. In a warehouse district this might be perfectly acceptable.

The greater the tendency toward congestion the more restrictions must be placed to prevent certain practices or customs, thus creating restraint on individual liberty. Good traffic regulation keeps these restrictions appropriate to the time and place, and yet simple and understandable in application. The need for restriction on the rights of individuals to use the streets is perfectly evident and is acceptable as being basically in the interests of public policy.

There are good reasons why we are confronted with an ever-present threat of street congestion. Definite economic advantages to the country and to the individual citizens are clearly evident because of the concentration of certain kinds of business in large cities. Similarly, there are definite clearly established advantages created by the concentration of certain activities of a large city within a small central area. Likewise, there is good reason for the creation of secondary business centers, which concentrate in small areas here and there throughout a city. The theory of decentralization is only partially sound. Decentralization of some activities to small communities or to outlying sections of large cities can be justified, but the basic plan of one concentrated business center, and a large number of small secondary centers in city development, as is well typified in

*Abstract of paper presented before the Illinois Electric Railways Association, Springfield, Ill., March 17, 18, 1927.

the city of Chicago, is fundamentally sound. It is not a mere happening or based on a false sense of values.

Practically all cities are confronted with street systems that for the most part consist of streets of 80 ft. or less in width. With modern twenty-story to forty-story buildings, some of which house between 8,000 and 10,000 regular employees, this street system that was laid out primarily for four-story buildings must be used very intensively and wisely. The only limitation that needs to be placed upon the building heights in Chicago is the limit that still permits adequate light and ventilation. The problem of transportation and of accessibility can be solved at a cost that is reasonable, considering the values created by the need for such business concentration. Accessibility to a business district is what creates and maintains its value.

### Individual Rights Give Way Before Community's Needs

Yet it is not necessary to permit each individual to use the streets leading to or in the busy district according to his own individual desires. The smaller the city the greater the liberty that can be granted to the individual to do what he chooses in making use of the streets. As the city grows the natural effect of the greater density of movement is to cause a larger percentage of citizens to see the folly of continuing, for example, to use their own private automobiles in going to and from business. Over 350,000 automobiles are registered in Chicago, and yet only about 90,000 vehicles cross the boundary line to the central district within a single day, although more than 800,000 persons enter this central district per day. It is not possible then to give the right of individual transportation to each person entering this district, neither is it necessary. Certain business vehicles must use the streets, public carriers are necessary to handle such large numbers, and street regulation should be so carefully developed as to provide the greatest possible speed and comfort for those using the public vehicles, who are the great majority, to those service vehicles necessary to the conduct of business and to as many private automobiles as can possibly be served by the street system existing.

It is not desirable to make the use of private automobiles impossible or difficult, but the greatest permissible freedom in the use of this highly appreciated modern convenience or luxury in American life should be one of the aims of traffic regulation.

The city of Chicago must provide subways and elevated railroads within the limit of its financial power, so as to create new street levels for the electric trains in order to leave the maximum of street space available for the other vehicles that must remain on the open streets. Since the streets cannot be widened horizontally in the central district and in many of the other busy areas, there must be an increase in capacity both by regulation of street use and by creating new levels on which the most effective carriers, namely, the electric trains, will operate.

Pending this development much can be done to improve on the existing usefulness of the streets, to increase speed, reduce costs of operation and to make more convenient all street use. Much has already been done in Chicago, as in other cities, such as regulation of parking in the rush hours, elimination of the left hand turns at the busier intersections, creation of through streets and boulevards for faster and freer operation, by installation of safety zones for street car passengers and by placing automatic signal control. Yet tremendous improvements may yet be made to increase the usefulness of the street system.

The creation of through streets and boulevards can make material improvements in the convenience of motor traffic, if laid out wisely and if rights of way are established equitably. Care should be taken, however, that traffic on important streets is not penalized unnecessarily or unfairly by being made to stop at a crossing with a through street or a boulevard, which at that particular intersection is serving a much less important purpose than the intersecting street. There has been a marked tendency everywhere to abuse the through street idea by creating through street or boulevard priority at points where such priority is harmful to the majority.

### Many Factors Affect Traffic

Although much has been done in piecemeal fashion, more remains to be done, and the serious problems have not yet been answered. The recommendations of the Chicago Association of Commerce as embodied in the code written as a part of the McClintock report and presented to Council in December, 1926, are likely to be adopted soon. The principal value from this new code will be:

1. Simplification of existing regulations.
2. Authority given to eliminate parking when necessary on the busy streets. Parking will be abolished in the central area throughout the entire business day and may be abolished wherever necessary in business districts throughout the city, and on petitions from 75 per cent of the registered voters along any section of street may be eliminated on that section during hours asked for by the petition. This is done to protect residents from being overrun by patrons of theaters or other amusements in the neighborhood.
3. Establishing a time limit of twenty minutes for loading or unloading of delivery vehicles.
4. Eliminating the standing for loading or unloading with end of vehicle to the curb.
5. Control of mid-block turns.

The McClintock report did not make sufficient study of, nor definite recommendations covering, certain obvious practices, which are very serious factors in creating street congestion. Some of these are:

The use of the streets by building contractors.

(a) For storage of materials.

(b) For temporary sidewalks.

(c) For standing of trucks during unloading, loading or hoisting.

(d) The blocking off by ropes during hoisting of materials to the upper levels.

Elimination of slow moving vehicles from business streets.

Parking of taxicabs in taxicab stands.

Cruising of taxicabs.

Cruising by chauffeurs of private automobiles.

Street repair work, work on underground structures, or underground utilities during the business day.

Sprinkling or washing the streets during business periods.

Delivery or acceptance of passengers by taxicabs at places other than at the curb or within street intersections.

Location of bus loading zones.

Development of detour trucking routes around busy centers.

Delivery of merchandise and heavy materials outside of business hours.

Obstructions on sidewalks near street intersections such as hydrants, newsstands, postal boxes, rubbish boxes and light poles.

Each of these items might be discussed at length. Obviously each one represents a restriction that must some day be given attention in the interest of the greatest good to the greatest number.

It seems always difficult to get good police enforcement of traffic regulation. Police departments in this country are unfortunately forced to be responsive to political pressure. Perhaps part of their laxity is due to faulty judicial practices, and the importance that judges attach to the need for votes instead of to creating public respect for existing laws and regulations. Carelessness and deliberate evasion of responsibility by the enforcing agencies are creating a great public indifference. Many drivers are totally ignorant of the rules of the road, and seem to have no thought of ordinary courtesy to others when driving. Most of the accidents that occur on the streets and highways would be avoided if those using the streets would extend reasonable courtesy and consideration to each other.

### Transportation Companies Should Lead Way

In developing better traffic regulation electric railway executives should take the most prominent part. Correct treatment of the traffic problem is of vital importance to the railway business and no other business has more at stake than the electric railways in developing safety and increased usefulness for the streets. It may seem to some that improving operating conditions for automobiles will be detrimental to the railway business, yet may we put it the other way. Unless operating conditions are improved on the streets used by electric railways the decrease in income to the railroad and the increase in expense of its operation will produce an impossible operating ratio. The railways cannot hope to prevent the competition of private automobiles and should not expect to gain business by increasing the discomforts of the users of private cars. If the railway service can be made attractive by adequate speed and reasonable freedom of movement, much more business will be attracted than if the cars are lost in street congestion.

Advantage to the railway operation is in these days of commission control of public utilities merely advantage to the car riders and the public officers

can easily be made to understand that in arranging for improvements in street car operation they are arranging for advantages to all the individual citizens or voters whom they represent. The development of the spirit of fair play, a willingness to be helpful to all interests as well as skilled ability when solving the problems that interest and affect the community and active leadership in directing and developing public discussion or consideration of these problems should be considered obligations upon the railway management. Such activities present rare opportunities for creating public good will and for improving materially the street railway business.

The problems encountered cannot be attacked or answered by casual study. There is need for men thoroughly skilled in the principles underlying traffic regulation. Some one within the organization should be carefully trained, or competent outside assistance should be brought in to assist the management. Much nuisance prevails in methods of traffic control and in signal installation. Many serious mistakes are being perpetrated, and not everyone who claims to be advised is competent. Some of our largest cities have the most glaring defects in their traffic regulation methods, and many imitations of these plans are producing great inconvenience in the smaller cities that are accepting such plans without due attention to correct control principles.

# Modernization of Cars*

By M. J. Oswald
Sales Representative, St. Louis Car Company

MUCH has been said and written recently about this subject, so there is bound to be repetition of considerable data which may sound familiar, which is due to the constant recurrence to this subject, whenever and wherever street railway men congregate, and is in itself another indication of the importance of this subject and the realization that modern cars are a dominant factor in the progress desired in successful street railway and interurban operation.

Looking at the situation from a cold-blooded business standpoint, the exhaustive survey made of twenty properties before and after modernization by the ELECTRIC RAILWAY JOURNAL shows that there is a reduction of 8 cents per car-mile in operating costs with 50 per cent modern cars. Before modernization the operating cost was 36.41 cents per car-mile and after 50 per cent modernization 28.29 cents per car-mile.

### New Car Savings

In the case of five out of these twenty roads practically all cars were purchased new during recent years, and after the acquisition of the new cars the reduction shown is 16 cents per car-mile instead of 8; i. e., the average operating costs of these five roads prior to installing new cars was 39.56 cents and afterward 23.64 cents per car-mile.

Another interesting fact brought out by this survey was that on a different group of twenty properties with approximately the same total number of cars, the same range of sizes, the same total population served, the same mileage and about the same proportion of city and interuban service, practically no new equipment has been purchased during the past ten years. The average operating cost is 37.94 cents per car-mile, or practically the same (in fact about 1½ cents higher) as the different group of twenty referred to above before their equipment was modernized.

These above figures speak for themselves as to the financial betterment in the use of modern cars, and it is evident that the scrapping of obsolete cars is profitable; furthermore, from the additional data given below, taken from the same survey, it is apparent that new cars pay for themselves.

As previously indicated, the saving of a group having all modern light-weight equipment is about 16 cents per car-mile in comparison with operating costs on old equipment—it was also mentioned on a larger group having about 50 per cent modern cars was half of this amount. Similarly, the cost on a property having an average car age of ten years is taken to be about 8 cents per car-mile more than a road having all modern equipment. If excess operating costs between these two points are taken in proportion to age of equipment, the results would be in dollars, based on 82,450 cars comprising the entire industry, a total of $181,707,000, which is equivalent to 12,000 new cars at $15,000 each; to be ultra-conservative, cut these figures in half and it would still show operating losses on present equipment more than enough to pay for a greater number of new cars per year than have ever been inaugurated by the entire industry in any single year in the past twenty.

Charles Gordon, editor of ELECTRIC RAILWAY JOURNAL, in his article in connection with the compilation of these statistics, mentions "that there may be operating conditions on various properties that would make it impossible to obtain the average savings shown, but the conditions covered by the properties studied are sufficiently general to warrant most careful consideration by every operator."

Also, please bear in mind that no account whatever is taken or even estimated of the effect of improved modern cars on increasing revenue. Unless some fallacy can be shown in the figures presented—and we invite discussion on same by those operating members present—the conclusion reflected resolves itself into an axiom, namely, "That obsolete equipment costs far more to maintain than new equipment costs to buy."

Granting that the foregoing has demonstrated that the substitution of new cars for old at certain periods is not only an economical gesture but a necessary part of the program of a progressive and successful railway system, why not incorporate in the new cars all the features which are consistent with modern standards of living, and so popularize this mode of transportation that the appeal to ride in the electric car is so strong that it stands first in the minds of the public. Unfortunately, the attitude in many places at present is, "Well, I suppose I will have to take the street car, as there is no other way to go!"

### Modernized Cars Needed

An operating expert about a year and a half ago said: "One of the greatest needs of the traction lines today is the modernized cars to replace equipment which not only fails to attract business, but actually repels it in many instances." Based on such a statement, what a wonderful opportunity there is to so change and improve the antiquated street car and its accessories to counteract the last part of the above statement to the effect that it "actually repels business in many instances."

It has been said, and we have to admit it, that one of the most noticeable features of modern life is the gradual awakening in the last decade or two of the American people to the perfection of form resulting from the harmonious combination of diverse elements in unity.

Architecture shows a marked improvement; houses are better plumbed, but more often built with an eye to form and pleasing appearance; contrast the cupolas and ginger-bread gimcracks of a "mansion" of the early Grover Cleveland or Benjamin Harrison period, or the boxlike plainness of a less pretentious home of yesterday, with the Colonial, Spanish or English adaptation of the residential sections of today.

Interior decoration is also infinitely more colorful and artistic than yesterday. Even automobiles have improved quite as much in line and design as in power and upholstery. So-called "Beauty Shops" thrive and turn over millions of dollars yearly because women are eager to make their faces or figures attractive, and this is not confined to any particular class, but the patrons are from every walk of life. This is just another phase of popular taste; it is true that people long to have attractive and pleasing surroundings and will patronize and popularize the vehicle that plays up this appeal to their taste.

In selling city or interurban car rides we cannot overlook the fact that a transportation vehicle which was designed merely for "utility" in order to keep pace with the trend of the times must become a thing of beauty with pleasing lines, attractive painting, easy riding trucks, no unsightly equipment showing, particularly in the interior, comfortable seats, neat floor covering and modern lighting fixtures with plenty of illumination. Heating is another item that should be given careful consideration.

Plate glass throughout the car also adds much to the pleasing appearance and perhaps really would be the economical thing in the long run, provided, of course, that the replacement of ordinary glass is a considerable item of maintenance and could be substantially reduced by the substitution of the

*Abstract of paper presented before the Illinois Electric Railways Association, Springfield, Ill., March 17, 18, 1927.

heavier and less fragile plate glass. On the regulation city car the cost of ¼-in. plate glass, as far as I can determine, is about four times that of the ordinary glass now universally used.

Mr. Gordon mentions in his article the Grand Rapids cars, which reflected a great many of the features mentioned above, and therefore it might be in order to mention the figures which are quoted below from *Electric Traction* of February, 1927, concerning the annual report of the above road, as follows: The gross earnings of the company increased $37,978 over 1925, while operating expenses decreased $45,170, largely due to the placing in service of the 27 new cars last June. In 1925 the company showed a deficit of $67,541 while for the year ended Dec. 31, 1926, a net income of $9,929 was shown.

You might also be interested in the following extract from Mr. DeLamarter's paper read at the C.E.R.A. convention at Toledo a few weeks ago: "During each month since the Grand Rapids rail coaches were placed in service the proportion of increase in passenger revenue on the three lines so equipped has been considerably higher than the increase shown on the balance of the lines. During seven months from June to December, 1926, passenger revenue increased 3.21 per cent over the corresponding period in 1925, while the passenger revenue for the same period on all other lines increased only 1.91 per cent."

### High-Speed Cars Show Results

By increasing the speed and installing modern cars a number of interurban railways, such as the Buffalo & Lake Erie, Pennsylvania-Ohio Electric, North Shore, Illinois Valley Division of the Illinois Traction System and numerous others have shown remarkable improvement as to increased revenue and popularizing the electric cars, and you all no doubt have had this called to your attention by various articles and figures that have been published.

It may be rather a broad statement, but personally I do not know of any city or interurban railway system in the United States that has not greatly improved its financial standing and public relations by replacing old equipment with new and modern cars. Furthermore, I heartily agree with these sentiments of City Manager Hopkins of Cleveland, Ohio, brought out in his address at the A.E.R.A. convention at Cleveland last year: "The American people are not an ungenerous or mean people. The American people, by and large, unless they are provoked or irritated or don't understand the situation, mean to pay anybody a fair return for anything he gives them."

Do not forget that the car is the "show window of the industry," and it has been demonstrated in merchandising that you must have an attractive show window in order to draw your customers inside. Incidentally, after he gets inside see to it that he is met by a courteous operator so that he will come again and tell his friends to patronize the electric railway line, and so popularize this method of transportation that it always stands first in the minds of the discriminating public of this progressive age.

## Governor Fuller Decries Legislative Meddling

CAR riders are not getting a fair break because of the legislative burdens placed on transportation companies, according to Alvan T. Fuller, Governor of Massachusetts, speaking at the annual banquet of the New England Street Railway Club, held March 24 at the Copley Plaza Hotel, Boston. The cost of building subways should not be paid entirely by the car riders, he said, because subways are built for the convenience of other users of the street as well as for the railway passengers. Moreover, the extension of a subway into the new district benefits the property owners. He referred also to the construction of a new bridge, the cost of which must be paid in part by the Boston Elevated Railway. All persons other than the car riders will use this bridge free of cost. Why, he asked, should the car rider have to pay for what is provided without cost to the users of other vehicles? In the Governor's opinion the problem is one of educating the public to appreciate the rights of the car riders.

Adequate transportation facilities are a necessity, he said. What other industry is so essential, he asked, that public trustees would be appointed by the state to operate the property when it became involved in financial difficulties, as was done some years ago for the Boston Elevated Railway and Eastern Massachusetts Street Railway. That portion of the public which uses electric railways is unorganized and inarticulate. For that reason it does not always receive fair treatment. The opportunity to improve transportation is an inspiring opportunity for public service, the Governor said. A beginning should be made by striking off the shackles of unfair charges that legislation has heaped upon the car rider.

Street railways in New England have put their houses in order and have come to understand by experience that the public is willing to pay for good service, according to Fred Gordon, retiring president of the club. He said that the rate of fare is incidental, and cited the case of a man who does not hesitate to use a taxicab and tip the driver far more than the entire cost of a comparable car ride would be. R. B. Stearns, incoming president of the club, expressed his gratification at being chosen for this post, and assured the members that he would do his utmost to make the coming year a successful one for the club.

Other speakers at the banquet included Malcolm E. Nichols, Mayor of Boston; Benjamin F. Cleaves, former chairman Maine Public Utilities Commission, and Frank P. Sibley, special correspondent Boston *Daily Globe*. Edward Dana, general manager Boston Elevated Railway, officiated as toastmaster.

At a business meeting held in the afternoon new officers were elected. Those chosen were:

President, Robert B. Stearns, Boston, Mass.

Vice - presidents: Massachusetts, Howard F. Fritch, Boston; Connecticut, J. K. Punderford, New Haven; New Hampshire, John B. Crawford, Concord; Vermont, T. B. Jones, Burlington; Maine, Edward M. Graham, Bangor; Rhode Island, Walter C. Slade, Providence.

Secretary, John W. Belling, Boston, Mass.

Treasurer, Fred F. Stockwell, Cambridge, Mass.

Executive Committee: H. M. Steward, Boston, Mass; George E. Haggas, Portland, Me.; H. R. Whitney, Springfield, Mass.; C. B. Pierce, New Bedford, Mass.; H. S. Day, Boston, Mass.; E. W. Davis, Boston, Mass.; George Acker, Boston, Mass.

## 90,000 Vehicles in Chicago Loop

IN REPORTING Mr. McIlraith's discussion of traffic conditions, on page 579 of the March 26 issue, it was stated that 800,000 vehicles enter the Chicag Loop district in twelve hours. This should have read—"more than 800,000 people enter the Loop district in twelve hours." The statement that 90,000 automobiles enter the business district in twelve hours is correct.

# American Association News

## Power Transmission and Distribution

PROGRESS reports were considered at the second meeting of the power transmission and distribution committee of the Engineering Association held in Chicago, Ill., on March 8. There were present at this meeting the following: F. McVittie, chairman; C. H. Jones, sponsor; J. W. Allen, C. Bailey representing C. L. Hancock, M. J. Cooke, H. Casey representing G. Wennegal, J. H. Drew, Mr. Daiman representing W. H. Bassett, D. D. Ewing, S. S. Hertz, W. Heeley, A. J. Klatte, K. J. Keith, J. Leisenring, H. S. Murphy, J. F. Neild, W. J. Quinn, M. B. Rosevear, D. L. Smith, A. Schlessinger, W. Schaake and R. D. Wade.

R. H. Rice, board of supervising engineers, Chicago, and C. Smith, Chicago Rapid Transit Company, were guests.

The chairman requested suggestions of subjects to be considered next year. The following three subjects were submitted: (1) Economics of electric track switches; (2) use of braking devices on reels, in stringing trolley wire; (3) reclamation of corroded steel poles.

The distribution representative on the special committee on current collecting devices requested the members of the power distribution committee to give freely any information on this subject which might be asked of them, since the subject was considered to be of considerable importance.

Each of the sub-committees presented a progress report. Sub-committee No. 3 on trolley wire wear will carry on the study of trolley wire breaks and will prepare data which will supplement that published in last year and in previous years. Sub-committee No. 4 on specifications for high-strength trolley wire showed that negotiations with the American Society for Testing

Materials were being continued and that a compromise on the points of issue in connection with this specification was very probable. Sub-committee No. 5 on radio interference stated that more study should be given to the previous reports on this subject by those experiencing this difficulty. The subcommittee investigating the possibility of establishing a standard by which various methods of operating and maintaining overhead lines may be compared has drawn up forms for collecting the necessary information. These forms will be filled in by the members of the committee and will then be summarized for discussion at the next meeting. The standardization of trolley reels has advanced to the point of a tentative size grouping of these preliminary dimensions and will be submitted to manufacturers and users of trolley reels for criticism before any attempt at standardization is made.

The next meeting will be held in New York on June 16 and 17.

# Unification of Car Design

## Engineering Association Committee Presents Progress Report for the Information of the Industry

WHEN the committee on unification of car design of the Engineering Association was appointed last fall one of the subjects assigned was to follow through the work begun last year by the committee on essential features of modern cars of the American Association. This latter committee made a report at the 1926 convention giving the requirements of present-day car designs, which was abstracted in ELECTRIC RAILWAY JOURNAL for June 26, 1926, page 1086.

The committee on unification of car design has now submitted a progress report, an abstract of which appears below:

In replies from member companies commenting on the report of the committee on essential features of modern cars, there seemed to be some question as to whether particular problems could be met by the recommendations contained in the report of the committee on essential features of modern cars. It was decided, after discussion, that the committee on unification of car design, acting through the secretary of the association, would be glad to take up for analysis the different problems of any of the operators that care to submit them, and will assist to the best of their ability in arriving at a solution of the problems that may arise as to car designs and necessary equipment details in connection therewith.

The car designs submitted were arrived at after careful study of a weighted average of representative cars that have been in successful operation throughout the country. The designs cover fundamental dimensions that are of the utmost importance to the car builder, if he is to place the building of cars on a production basis. No attempt has been made to present a completely designed car that would be adaptable to all properties. The details covered, however, are adaptable to practically all properties, subject to some few modifications in special cars, where physical limitations require changes. It is recommended that member companies contemplating the purchase of new cars give careful study to the 1926 report of the committee on essential features of modern cars before a definite decision is made.

By using these fundamental recommendations, with supplemental detail to meet the individual properties' requirements, the builders will be able to reduce materially their engineering and special equipment requirements, group their production operations, and thus facilitate the building of equipment, with its attendant lowering of costs. Any saving thus obtained by the builder is of twofold advantage to the user—a lowering of first cost and an earlier delivery of equipment. It is also a step toward standardization of equipment, which embodies the best features from not one but a large number of operating properties.

### WHY SOME COMPANIES DID NOT FOLLOW COMMITTEE'S RECOMMENDATIONS

As a result of the committee's discussion a number of points were brought out as to the reasons why some companies adopted, and others did not adopt, the recommendations of the committee. In one case, a company made an earnest attempt to follow out completely the recommendations of the committee on the fundamental dimensions and weights. This company submitted its plans and specifications to the association, asking that they be compared with the recommendations made in the 1926 report. In various instances the design and dimensions submitted differed from the recommendations, as a result of which several conferences were held with officials of the company, to see if the design could be modified to embody all of the committee's recommendations. This was at first believed impossible, due to the peculiar character of the service, which was a combined city and interurban service, and due also to rather limited clearances on curves.

Following these conferences, this company made a careful analysis of the design and shortly after was able to modify it so that the car body between corner posts in every way met the committee's recommendations as to the design of interurban car. Since this car operated through a number of small communities, where operating conditions require rapid loading and unloading of passengers, it was considered advisable to adopt a platform design substantially the same as that recommended by the committee for city cars.

The result of all this is that the company now has a car that can be said to meet with the committee's recommendations and that is in every way satisfactory to the operating company, although at first it was not believed that this was possible.

Another instance was discussed wherein an operator of one of the small properties was in the market for a few cars. Considerable time and money had been spent in preparation of specifications for a car that was considered necessary for the individual conditions. The specifications, however, as prepared, were not sufficiently different in the salient features to preclude the adoption of the recommended A.E.R.A. car. The car builders, therefore, offered this company cars of the dimensions and arrangement recommended by the committee for general use, at a saving of from 15 to 20 per cent in cost, due to the possibility of using existing engineering data, drawings and templates. The operating company, however, after much consideration, decided to purchase cars in accordance with its original specifications, and forego the saving in investment and the possibility of securing the cars at an earlier date.

This illustrates a case where a small company could have obtained every desirable feature of style and furnishing which was considered necessary to make the cars attractive in appearance, and at the same time comfortable and convenient for the patrons, at a material reduction in cost. The manufacturer, at the same time, was willing to guarantee that this car, built in accordance with the recommendations of the 1926 committee, would be at least equal in attractiveness to the customer's own design, and was entirely willing to guarantee every feature of the construction. This is one example where individual tastes are working as a detriment to the activities of the association as a whole, in its endeavor to bring about conditions which will tend to lower the cost of cars.

The committee has the assurance of the car builders in general that they are willing to proceed with the manufacture of cars built in conformity with the designs recommended by it. It believes that if the member companies will use cars built in conformity with these general recommendations a definite saving will be made in the cost of cars. The car builders have pointed out that the cost of engineering alone, for a group of cars, runs on the average anywhere from $1,500 to $2,000. In the purchasing of cars as covered by the committee's recommendation, this cost of engineering would be materially reduced. This cost alone, for a lot of ten cars, amounts to $150 to $200 a car. The time of delivery, also a very great factor with cars of special design, will be shorter for cars built in conformity with the recommendations of the committee.

In order that some definite designation be given to the types of cars as covered by the 1926 report of the committee on essential features of modern cars, it was decided, after discussion, to recommend that the designs for the city cars be known as "A.E.R.A. City Car Design" and that the designs for the interurban cars be known as "A.E.R.A. Interurban Car Design."

The report was signed by J. A. Brooks, C. A. Burleson, W. J. Clardy, L. J. Davis, C. Gordon, J. W. Hulme, G. L. Kippenberger, J. Lindall, V. Willoughby, A. P. Jenks, A. L. Kasemeter and H. H. Adams, chairman.

# The News of the Industry

## New Lines Suggested for Boston "L"

**Legislative Committee Suggests Construction of Tunnels—Termination of Public Control Debated**

A new rapid transit extension plan has been adopted by the committees on metropolitan affairs and street railways of the Massachusetts Legislature for new lines to be built on the Boston Elevated Railway system. This bill, which has been reported in the Senate, provides for carrying out the plans for rapid transit extensions which the Legislature two years ago directed the planning board to study and report upon. The bill calls for the construction and operation of two rapid transit lines through the center of Boston, one of the lines starting at North Cambridge, extending through Somerville to Lechmere Square, and thence utilizing the existing viaduct to the North station, the Tremont Street subway to the present terminus of that subway at Broadway and Tremont Street, thence by new construction to a point near the corner of Huntington Avenue, and Tremont Street, Roxbury, with stations near the Back Bay station, West Newton Street, Massachusetts Avenue and the Opera House.

### Five Years to Complete

The other line provides for an extension of the East Boston tunnel in East Boston, and starting from the terminus of that extension trains would run through the East Boston tunnel and a new tunnel connecting with the westerly tracks of the Tremont Street subway at Park Street, thence to Boylston Street, and through the Boylston Street subway to Governor's Square, and by new construction under Governor's Square, and out Commonwealth Avenue, to Harvard Avenue or some terminal beyond. The present plans of the planning division are that the extension in East Boston would connect with the Revere Beach & Lynn at the Wood Island station. It is estimated that it will require five years to complete the construction of these two new rapid transit lines. No new rapid transit extensions have been made, with the exception of the Shawmut branch, since the opening of the Cambridge subway in 1912. It is true, however, that the short extension from Sullivan Square to Everett was opened in 1919, but this extension was of minor importance; were it not for the development of the automobile during the past ten years the present transportation system would have long since been totally inadequate.

This bill ties up somewhat with the other Elevated bill for the 25 year extension of public control, because the financing of the extensions is provided for in that public control bill.

Strong opposition is developing to the public control bill. A substantial minority from the metropolitan affairs and street railway committees has decided to urge termination of public control and the return of the Elevated to its stockholders. It has filed a bill to that effect, to give the Elevated notice of the return to private ownership by July, 1929. A legislative hearing on this general subject was given on March 29, and it was expected that the Elevated stockholders, directors and trustees would express themselves regarding the plan for a 25-year extension of public control. But these three groups remained silent, except for one small stockholder who told the legislative committees that he did not care whether the Elevated property were returned, or the public control extended; he said that the stockholders can run the property now if it is given back to them without any stranglehold from the Legislature.

## Mayor Signs Amended Parking Ordinance for Philadelphia

The amended parking ordinance providing one-hour parking on Broad, Market, Arch and several other central city streets of Philadelphia, Pa., became a law when Mayor Kendrick signed the measure on March 28. Comment on the change in the parking regulations was made in the Electric Railway Journal in the issue of March 26, page 560.

Passage of the amendatory ordinance came as the result of organized opposition by central city business men to the drastic measure which banned parking in a large downtown area. The new law limits the affected area to the district bounded by Vine and Pine Streets and Delaware Avenue and 23d Street.

Under the terms of the ordinance no parking is allowed within 100 ft. of any street intersection where a trolley-loading platform or safety zone is established, and 40 ft. from any other street intersection; no parking is allowed at any time on any street less than 20 ft. wide for a period longer than necessary to load or unload in the restricted area; no parking is permitted anywhere in the city between 3 a.m. and 6:30 a.m.

## Proposed Change in New Jersey Fares Suspended

Further suspension was directed by the Board of Public Utility Commissioners of New Jersey on March 26 of proposed changes of fare zones by the Public Service Railway and the Public Service Transportation Company. The new rates were to have become effective on Jan. 1, but the board suspended the change until April 1. The further suspension will be for a period not exceeding three months from April 1, unless the board disposes of the case sooner.

## United Suburban Railway Takes Form

**New Lease on Life for Michigan Company Celebrated at Enthusiastic Meeting—All Grandville There**

In Grandville, Mich., one of the smallest villages in the state, the shortest interurban railway with the longest list of stockholders in the United States was born recently when the United Suburban Railway came into being. The new company will take over and operate the defunct Grand Rapids, Holland & Chicago Interurban line between Grand Rapids and Jenison, a distance of 8.3 miles. Representatives of 700 families along the railroad, all stockholders of the company, and six Grand Rapids bankers and business men attended the birthday party when organization of the company was completed, by-laws adopted, directors elected, contract of purchase ratified and $7,000 additional stock subscribed to bring the total subscriptions up to $50,600, the amount required to close the deal.

### Drive for Sufficient Funds

By a peculiar circumstance the Rev. J. P. Battema, pastor of the Wyoming Park Christian Reformed Church, was chosen temporary chairman of the meeting. It was he as a minister who spoke the last words over the old line when it quit business last November and it was he at this meeting who spoke the first words over the new line. The six Grand Rapids bankers and business men, Dudley E. Waters, president of the Grand Rapids National Bank; Gilbert L. Daane, president of the Grand Rapids Savings Bank; Benjamin S. Hanchett, one of the promoters of the original Grand Rapids, Holland & Lake Michigan Railway; Arthur E. Wells, Eugene Richards and Harold M. Braudy, the latter being purchasing agent of the defunct line, injected pep and enthusiasm into the meeting. Their efforts brought the drive for sufficient funds to a successful culmination. They were among the first to subscribe for ten shares of stock when the call for additional shares was issued, increasing their bids to fifteen shares to insure the quota.

Harold T. Slaght, cashier of the Grandville State Bank, who has been the prime mover and guiding spirit in the rejuvenation of the road, was elected director-at-large. Other directors elected from a field of twenty candidates from the different communities to be served by the line are: A. Dick and William Huizenga of Galewood, Paul Gezon of Wyoming Park, E. F. McCarrick of Hamilton and Edward Miller and Gerritt Zuidema of Grandville. Officers will be elected later.

Conditions of the contract of purchase as ratified call for the payment of $30,000 for the old railroad. The Consumers Power Company, the owner,

has offered to lease the right-of-way to the new railroad at an annual rental of $1,000 plus taxes, while the Michigan Railway has offered the use of its tracks from Grandville Avenue junction, at the southwestern limits of the city, to its terminal in the heart of Grand Rapids, for 20 cents a car-mile and a terminal charge of $4,500 a year.

During the meeting Y. Groendyke, chairman of the nominating committee, termed the project as "a railroad owned by the people, operated by the people and patronized by the people." He said if the line fails to pay it will be because the people of Wyoming township have a grudge against themselves.

## Wages on Interborough Advanced 5 Per Cent

A 5 per cent increase in pay for its employees who are members of the Brotherhood of Interborough Rapid Transit Company Employees was announced on March 29 by the Interborough Rapid Transit Company, New York, to be effective on April 1. This means an extra annual expenditure by the company of approximately $1,500,000. The advance will affect nearly 15,000 employees, members of the operating, mechanical and clerical departments.

The announcement was made by Frank Hedley, president of the company, following action by the board of directors at which Mr. Hedley read a letter from M. J. Mangan, secretary of the brotherhood, requesting the increase, and suggesting a two-year contract with the brotherhood at the increased rate. This contract will be drawn up and signed shortly. A statement by Mr. Hedley said:

By this increase the company makes the second of the 5 per cent readjustments in pay following the voluntary reduction of 10 per cent to which the employees agreed in 1921 as their contribution to the plan to keep the Interborough out of receivership. The first 5 per cent was restored in 1923 and the second at this time. This is in accordance with the company's pledge that wages would be raised just as soon as finances permitted.

The Interborough is able to grant this increase, which amounts to approximately $1,500,000 a year, by the utmost economy in other directions and by the most careful management of every department. For a long time we have all realized that these employees should have more money and our aims and hopes in this direction are now achieved to the very limit of our financial ability. Every cent which might be utilized for this purpose is absorbed by the new agreement.

At present motormen receive 82 cents an hour and guards 54⅝ cents as the top rate or $4.37 for a day of eight hours.

## New Suggestions Offered on Rainier Project

Requests that it be permitted to have a monopoly of transportation in the district which it serves and no longer be required to pay the city a franchise tax featured proposals made to the Seattle, Wash., City Council recently by the Seattle & Rainier Valley Railway, through M. E. Samsell of Chicago, its president. The conference was secret and the only statement was that of E. L. Blaine, finance chairman and official spokesman for the Council.

Plans to have the city take over the railway on a leasing arrangement were discarded as impractical.

## Through Service Between Chicago and Central Illinois Awaited

With the completion about May 1 of a short stretch of connecting track in the city of Joliet, Ill., through interurban railway service will be established for the first time between Chicago and central Illinois valley points, according to a statement issued March 21 by J. R. Blackhall, vice-president of the Chicago & Joliet Electric Railway. A joint operating agreement recently consummated by the Chicago & Joliet line and the Valley division of the Illinois Traction System calls for the operation of the latter's cars from the Chicago terminal of the Chicago & Joliet at Archer Avenue, by way of Joliet, Morris and Ottawa through to Princeton, Ill., a distance of more than 110 miles. From Chicago to Joliet the cars would use the tracks of the Chicago & Joliet line and the Illinois Traction System rails from Joliet westward. Tentative plans provide for four round trips daily, two in the morning and two in the afternoon and evening.

The Illinois Traction system's popular new "Tangerine" light-weight, one-man interurban cars will be operated in this service, stopping only at the larger towns and providing "limited" service over the Illinois Valley division for the first time.

Although the project was approved by both companies last December, actual construction work, which will be undertaken by the Chicago & Joliet line, has been delayed for several months due to the municipal primary election on April 19, Mr. Blackhall explained. He added, however, that permission to make the physical connection between the two lines would undoubtedly be granted by the city commissioners immediately after the election and that he hoped service could be started by May 1. All materials for the work are now on hand.

## Power Cost Condition in Seattle Not Obligatory for Deal

Negotiations between the city of Seattle and the Puget Sound Power & Light Company for a reduction in the annual payments on the purchase of the Seattle Municipal Street Railway have advanced a step further with the assurance by A. W. Leonard that he will not insist on a ½-cent rate for power furnished by the city lighting department to the railway for its operation. In the power company's offer to the city for an extension of time on the purchase bonds, Mr. Leonard had imposed a condition that the present rate charged for electric railway power be lowered to ½ cent, but he now states that if this means that the city light department would be supplying the power at less than cost of production, he will not insist upon this condition.

The present rate charged is 1 cent a kilowatt-hour. City officials have tentatively agreed upon a ¾-cent rate. This they plan to suggest to Mr. Leonard, and it is understood that the latter will be satisfied with this rate if he is convinced that the city cannot furnish the power at a cheaper rate without loss. Meantime a report on production costs is being prepared by the lighting department, upon which the Council will decide a rate to be submitted for further dealing with the Puget Sound company.

The litigation involving the railway pending in the federal court is no nearer settlement than it was weeks ago. Various delays have continued the hearings from time to time. The only litigation in which the city is involved now is the Von Herberg suit, which seeks an order restraining the city from paying any further money on bond redemption and interest until all labor and operating costs have been met.

## Fare Petition Formally Presented in Macon

The formal petition of the Macon Railway & Light Company, Macon, Ga., for increased fare, rerouting of lines and other concessions was presented to the City Council on March 15 and referred to the public utilities committee. The company wants a 10-cent cash fare with three tickets for 25 cents: lifting of paving assessments and gross receipts tax; permission to change schedules and to reroute nearly every line. In return it proposes to rehabilitate the entire system, building new track and sidings, buying ten new cars, and spending in all a total of $314,000. The present fare is 7 cents.

## Transit Matters in Philadelphia Passed Upon by Commission

The Public Service Commission of Pennsylvania on March 29 rejected the proposed new lease of the Frankford Elevated to the Philadelphia Rapid Transit Company and approved the Chestnut Street subway agreement with the city. The latter provides for construction of a surface car subway by the municipality to be leased to the transit company until such time as rental payments equal cost of construction, when title will pass to the Philadelphia Rapid Transit Company. Consent of commission to Frankford "L" lease was withheld because of conviction that no lease for that line should be signed which does not include provision for rental to the transit company of the Broad Street subway.

## Ordinance Against One-Man Cars in Buffalo Overruled

The city ordinance at Buffalo, N. Y., which makes it unlawful for the operator of a street car to engage in the performance of any other duty while the car is in motion, aimed primarily against one-man cars in operation by the International Railway, is unconstitutional. City Court Judge Peter Maul so ruled in a decision handed down in a test case when the police department arrested an operator of a one-man car in an action to recover $50 penalty for violating the new rule.

Judge Maul cited the opinions of higher courts upholding the regulatory authority of the Public Service Commission with respect to the railway and held that the city is without authority to legislate against one-man car operation. The city's case was dismissed.

## Paving Measure Passes in Utah

House bill No. 120, recently passed by the Utah Legislature and signed by Governor Dern, provides that every electric railway in Utah shall, at its own expense, restore the pavement, including foundation thereof, of every street disturbed by it in the construction, reconstruction, removal or repair of its tracks, in the same condition as before the disturbance thereof, to the satisfaction of the Board of City Commissioners or City Council having charge of such street. The obligation imposed by this act shall, in cites of the state of Utah, other than cities of the first class, be in lieu and substitution of any and all other obligations of any such company to pave, repave or repair any street, or to pay any part of the cost thereof.

When any street of any city, other than cities of the first class, occupied by the tracks of the railway is to be paved or repaved, the Board of City Commissioners, or the Mayor, and City Council of said city is vested with authority to assess the entire cost of paving or repaving such street, including the portion occupied by said tracks, against the abutting property.

## Railway in Saginaw Oil Boom Area

Oil has been struck in Saginaw, Mich. As a result that city has taken on the appearance of a new El Dorado. And the discovery doesn't seem to be a flash in the pan, either. Many of the big companies have begun operating. The Sun Oil Company is on the ground, so is the Ohio Oil and a host of others. So is the Saginaw Transit Company, for some of its property is believed to be in the "strike" area. It is too early to attempt to predict to what extent the railway and bus company will become an oil producer, but its management doesn't propose to miss any bets.

Every acre included in the present field, which extends 2½ miles northwest of the Saginaw business district and is 1½ miles wide, is under lease to the pioneer companies. There is a derrick within a block and a half of the city's largest office building. The flow is there, but there are no gushers. After the initial tumult and shouting has died, a sane appraisal of the prospects will be in order. Then will the transit company know to just what extent it will be a participant in an oil boom that for the present at least has set the whole city topsyturvy.

## Houston Company Educates Riding Public

The Houston Electric Company, Houston, Tex., is running a series of newspaper advertisements in its campaign to educate the riding public to the need for an increased fare. One advertisement, entitled "The Future of Public Transportation—Street Cars vs. Buses," stated that the new schedule of rates proposed would provide a lower rate for the constant user and a somewhat higher rate for the infrequent user. The company's fare petition was digested in the JOURNAL recently.

"Will Livelong"

## "Will Livelong" in Philadelphia—Make April Safe

Municipal authorities of Philadelphia, Pa., have viséd the passport of "Will Livelong," the safety sage, who as the guest of the Philadelphia Rapid Transit Company will spend the month of April in the Quaker City with the promise to augment the happiness of Philadelphians by reducing the accident hazards of the streets. This kindly, wise old gentleman will be on hand, if not in person at least in picture, to caution children not to play in busy streets; to advise pedestrians to have a care when inclined to indulge in the dangerous practice of jay-walking, and to urge motorists to think for the other fellow as well as for themselves.

Behind this safety campaign are lined up a great many aggressive factors in the community life, including such organizations as the citizens' safety committee of the Chamber of Commerce, the public and parochial schools, the Automobile Club of Philadelphia, the Keystone Automobile Club, the Safety Patrol, the Boy Scouts and Girl Scouts. All other organizations in the city are being asked to lend their active support to the campaign and to contribute to its success by urging the idea and practice of safety upon their members.

A special safety Sunday will be set aside later in the month, at which time the various churches and religious organizations of the city will be asked to co-operate by emphasizing the importance of street safety and by discussing ways and means of reducing the accident hazard.

Each week of April will be devoted to special phases of the campaign. The first week, from April 3 to 9 inclusive, will be devoted to accidents involving children. This phase of the activity is advanced in an effort to reduce the 134 fatal accidents and 4,284 non-fatal accidents involving Philadelphia children during 1926. Later in the month will come periods devoted to pedestrian accidents and automobile accidents.

Headquarters of the "Will Livelong" safety campaign are located on the thirteenth floor of the Hotel Touraine, 1520 Spruce Street.

## Subway Proposed in Fulton Street, Brooklyn

The route and plan for a subway in Fulton Street, Brooklyn, N. Y., was adopted on March 31 by the Board of Transportation, which sent a resolution to that effect to the Board of Estimate for approval. The plan calls for a four-track subway which will be the main trunk line of the city's new subway system in Brooklyn. It is expected that the new subway, which is to be constructed from Lafayette Avenue to Alabama Avenue, will hasten the removal of most of the elevated railroad in Fulton Street.

Another resolution was adopted by the board directing Robert Ridgway, chief engineer, to report on the cost of extending the Fulton Street subway from Alabama Avenue to the county line between Kings and Queens and to study the availability of other lines for this extension. A report was also requested on the best method of transfer connection with the Atlantic Avenue division of the Long Island Railroad and best methods of eliminating grade crossings over the railroad tracks.

## One-Man Cars on Barberton Run

One-man car operation has become effective on the Barberton-Wadsworth line of the Northern Ohio Power & Light Company. The change is made for two reasons—safety and economy. More than a year of one-man operation in Akron has demonstrated the value of one-man car operation from the standpoint of safety and the company believes that as soon as the public becomes accustomed to the change it will fully approve the move.

The pay-enter plan has been adopted and passengers will board and leave cars at the front. The center exit will not be used. Zone checks are being used. Passengers boarding cars westbound in Akron will not pay as they board the cars, but pay as they leave. Eastbound passengers boarding cars between Wadsworth and Sherman will also pay as they leave. Passengers in the other zones pay as they board cars and secure a check showing destination to which fare is paid.

## Thank You Aids in New Brighton

Think you, "thank you" deserves no praise?
It may not directly get you a raise
But it does spread cheer
So at the end of the year
You'll have no fear
But lots of good will, piled up for you, Bill,
And a great big THANK YOU—
from the BEAVER VALLEY BOARD.

Have you heard a thank you? Jot it down. It's contagious with the Beaver Valley Traction men. Each man in the company is a thank you scout, and when he hears a fellow worker praised by a patron for some little kindness or courteous act he takes this as his clue, writes it down in his notebook and at the end of the day transmits it to some member of the board—the dispatcher, superintendent, commercial manager or even the general manager, himself—who passes it on to the original man.

This is the gist of the latest bulletin of C. D. Smith, general manager.

## Unusual Publicity Campaign in Grand Rapids

In the campaign literature used by the Grand Rapids Railway, Grand Rapids, Mich., in connection with the paving referendum submitted to the voters at the March 7 primary four stunts were especially interesting and served as evidence of the efforts of the company to win approval to its idea of relief from the cost of paving between the tracks. The measure, which was lost by a vote of 3,375 for and 4,612 against, was referred to in the ELECTRIC RAILWAY JOURNAL, issue of March 26, page 586.

A convincing piece of publicity literature was a bulletin sent out with a letter from the secretary of the Chamber of Commerce to all members of that organization and to factory employees. Factory owners used the material for tack-ups near the time clocks in their shops. The bulletin read that a "yes" vote had been unanimously approved and indorsed by the Grand Rapids Civic Round Table. Another idea was the distribution to the railway organization of pledge cards to help get out the vote. It was called "Votes I Can Secure." Another device was the slip-in connection with the employees' pay checks. On this paper nine results of a "yes" vote were listed. A departure from the usual form of advertising was the issuance of cards by all drivers of the Yellow Cab Company of Grand Rapids in helping the railway in its campaign. The message of the Yellow Cab Company recognized the Grand Rapids Railway as a competitor, but was "happy to co-operate with any movement or enterprise that will help Grand Rapids progress." Invisibly written on the card was the name of Bert Kenyon, manager of the Yellow Cab Company, who apparently believes that working with Mr. DeLamarter means the growth of his city.

# News Notes

**Would Suffer the Little Children.**—A reduction in fare from 7 cents to 5 cents for children under 15 years of age was authorized on March 25 on the lines of the Johnson City Traction Company, Johnson City, Tenn., by the State Railroad & Public Utilities Commission. The commission also authorized the company to issue weekly passes to sell for $1.25 and allowed the sale of fifteen tickets for $1. The Johnson City Traction Company recently raised fares by the consent of the commission and discovered that it lost the business of the school children, who walked rather than pay 7 cents. It is with the desire of restoring the patronage of the children that the fare has been reduced.

**Would Abandon Franchise Rights.**—The Key System Transit Company has applied to the California Railroad Commission for authority to abandon its franchise rights on East Sixteenth Street between Second Avenue and Fourteenth Avenue in the city of Oakland and for a certificate declaring public convenience and necessity require construction and operation of a connection between applicant's Eighteenth Street line and its East Sixteenth Street line on and along Fourteenth Avenue. The railway sets forth that the city of Oakland proposes to pave East Sixteenth Street, throwing an expense of $88,000 on it, which is not warranted by the traffic on the lines.

**New Caps and Badges in Kansas City.**—The old style caps and badges worn by transportation employees of the Kansas City Railway, Kansas City, Mo., were replaced on Feb. 1 by new headgear similar in design to that worn by motor coach operators. The new caps are blue and have a larger and more loosely fitting crown. The badges of the new Kansas City Public Service Company are also of a different design. The expense of the new equipment was borne by the company.

**Talks on Safety to Students.**—Safety talks will be given to the school children of Atlanta, Ga., by a selected group of trainmen of the Georgia Power Company. Under plans outlined by Safety Director W. J. Rountree and H. Reid Hunter, assistant superintendent of the Atlanta public schools, every school will be visited. All addresses will be centered about three major points—conduct in street cars, on streets and hazards of bicycle riding.

**Hearing Held on Oneida Fares.**—Commissioner Van Voorhis held a hearing on March 25 on the application of the New York State Railways to the Public Service Commission for permission to increase fares from 7 to 10 cents, with three tickets for 25 cents, in the Oneida district between Sherill and Wampsville. Corporation Counsel Scoville, representing Oneida, withdrew opposition to the increase in fare on the stipulation by the railway to give a 30-day commutation ticket from Oneida to Wampsville for $2.50 for 50 rides; a round-trip ticket for 15 cents between Oneida and Wampsville, and to continue the sale of the workmen's tickets as at present at 11 cents.

**Another Store Gives Free Rides.**—The Reps store of Springfield, Mo., recently held a sale and provided free transportation on the local cars of the Springfield Traction Company between the hours of 9 and 10 o'clock on a Monday morning. As a result of this enterprise, coupled with judicious advertising, the store broke all records for sales during 28 years of business. The store's advertising for that sale day covered ten full pages in the Springfield *Daily News*, Sunday issue.

**Amended Fare Order in Syracuse.**—The Public Service Commission amended its order of Feb. 2, 1927, on March 24, in reference to fares on the Syracuse line of the New York State Railways by permitting the railway to sell six tickets for 45 cents on its cars and to establish at least fifteen stations in Syracuse where tickets or tokens will be on sale at the rate of four tickets or tokens for 30 cents, provided these stations can be established without expense to the company. This amended order is to become effective on April 1 and to remain in effect for 60 days thereafter or until otherwise ordered by the commission.

**Cars Carry Falls Illumination Display.**—A large display sign calling attention to the nightly illumination of Niagara Falls, N. Y., was carried in more than 700 city and interurban cars of the International Railway, Buffalo, on March 28. The sign, centrally located in the interior of the cars, shows a night view of the American Falls at Prospect Point, together with the announcement of the time of the illumination. The wide display on all cars with the suggested beauty of the falls at night is expected to stimulate travel to Niagara Falls.

**Pamphlet on Railways Distributed.**—"He profits most who serves best" is peculiarly applicable to an electric railway and finds its exemplification in the history of every successful street railway. This statement was made the conclusion of a paper read before the Memphis Engineers Club on March 7 by A. D. McWhorter, general superintendent of the Memphis Street Railway, and copied for distribution in pamphlet form with the compliments of the Memphis Street Railway. In some 20-odd pages Mr. McWhorter traces the history of street railways as a factor in transportation and gives some details on the Memphis system. Comment from the *Daily Post*, *Daily Argus* and the *Public Ledger* of May 30, 1866, on the inception of railway operation is reproduced.

**Employee's Right Upheld.**—The Indiana Public Service Commission on March 18 overruled a motion filed earlier in the week by attorneys for the Indianapolis Street Railway to dismiss the petition of James Green, an employee, that the commission act as a board of arbitration to effect a new wage scale agreement. Mr. Green filed a petition for redress of grievances as provided in a working agreement he said he signed with the company. Attorneys for the company then filed a motion to dismiss the petition, contending that his move was not made in good faith as he represented no one but himself and that the commission had no jurisdiction. The order issued March 18 said in part that "the contract under which this proceeding was instituted was, among other things, for the purpose of guaranteeing to the employees of the respondent signing the contract an effectual and constantly available remedy to adjudicate all controversies which may at any time arise." No date was set for hearing the employee's petition.

# Foreign News

## Automatic Substations for Cape Town Suburban Railway

When the electrification now in progress on the Cape Town Suburban Railway is completed it will be the first line in South Africa to have all its substation equipment automatically operated and remote-controlled. The line runs from Cape Town to Simonstown, a distance of about 30 miles. It will have six substations, each of which will contain one or more pairs of

1,000-kw. rotary converters by which three-phase current at 33,000 or 12,000 volts from the Salt River power station will be converted to 1,500 volts direct current for operation. The load dispatcher at the central station will be able to start or stop the rotary converters at any of the substations and will be assured by means of visual indications that the machines have done what he wishes and are working properly. For this purpose the all-relay tandem supervisory system of power control of the General Electric Company of England has been adopted. The twelve pairs of rotary converter sets, with automatic starting equipment, high-speed circuit breakers, etc., are being made at the company's Witton Engineering Works, Birmingham. Supervisory control equipment, really a telephone engineering job, is being supplied by the Peel Connor Telephone Works, Coventry.

### Lack of Funds Halts French Electrification Program

Electrification of the seven regions in France as outlined in the rather extensive program which started at the conclusion of the World War has been halted because of lack of funds. Unison of these lines began to show progress two years ago, because the regions lying closest to the Alps and Pyrenees having the most available water power were developed first. Five or six years is the length of time to erect hydraulic-electric generating stations. For this reason the cost of construction is enormous, since long-term loans have risen in cost from 5 per cent to 13 and 14 per cent. Several proposals for construction of the program have been made, but the only reasonable solution seems to be the stabilization of the franc, according to industrial authorities.

**Success of 2d. Maximum Fares in Glasgow.**—The 2d. maximum fare for any distance beyond the 1d. stage, introduced on the Glasgow Tramways in the middle of last year, continues to produce higher traffic receipts. From the beginning of the financial year on June 1, 1926, until Feb. 7, 1927, there was an increase in revenue of £2,255 after wiping out a decrease of £10,000 when the old graded fares were in operation.

**Escalators Increase Traffic in London Stations**—Traffic has increased in tube railway stations in London since escalators have replaced stairs. The reconstructed station at Picadilly Circus will have at least eleven of them and will handle an annual traffic of 50,000,000 passengers. At the present time there are 64 of these moving stairs in 30 of the city's stations. When the present scheme of extension is completed 85 escalators will be installed at 34 stations. One up and down escalator is said to have the capacity of five stairways. The speed of the individual escalator is little more than 1 m.p.h., but the total number on the system in the course of a twenty-hour day travel about 1,500 miles. When the scheme is completed the daily performance will be 2,000 miles.

# Recent Bus Developments

## Allentown Problem Solved

**Lehigh Valley Transit Official Discovers Efficacy of Schedule Cards in Education of Potential Bus Riders**

"Getting the people to know your schedule is the same thing as advertising your service. The cost is a comparatively small one—the result is big, in our case, at least." This is the opinion of Henry F. Dicke, assistant to the president of the Lehigh Valley Transit Company, Allentown, Pa., who was confronted with the problem of selling the bus to the riding public. The idea was brought forward that a substantial, hard-wearing time-table would be an ever-present reminder of the bus lines. Accordingly celluloid cards were printed and 20,000 distributed through the bus passengers and among the big plants and stores. Upon one side was the picture of the new bus in its natural colors, topped by the caption "Turner Street Bus Line," and below, "The Lehigh Valley Transportation Company." On the reverse side was the schedule, telling of the time of arrivals at each of the important intersections, daily and nightly, eastbound and westbound. The card fitted nicely into a wallet or a vest pocket. The schedule card proved to be not only a convenience and reminder but also the final and necessary touch to the company's campaign for the installation of bus service.

When the Lehigh Valley Transit Company, under the title of the Lehigh Valley Transportation Company, recently added four large Mack buses to the organization it became noticeable that although the bus fleet covered the major part of its route through a section which needed additional transit facilities many potential passengers waited upon a spot where there were rails and trolley wire. Years and years of habit were driving them to walk varying distances to ride upon a car, while they might as well have saved the walk and taken the bus, which was being run directly for their convenience. A survey among the people of the territory covered by the bus lines revealed the fact that those who had clamored for the service knew nothing of the schedule of the buses, although the time-table had been published frequently in the papers. It was soon learned that the average person as he scanned the printed page would not cut out such a list because the paper soiled quickly and the wear and tear destroyed it in a short time.

In addition to the company's scheme to print the schedule card the buses were routed along Hamilton Street, the main thoroughfare. The buses stopped at the same loading platform as did the trolleys. The bright red and yellow coloring of the buses was distinctive and it created attention. People began to notice the buses. Presently the number of bus passengers began to mount.

A service has been started for parties and clubs, carrying them everywhere. This phase of the service received a most decided impetus when the Allentown Chamber of Commerce was convinced of the practicability of using two buses to transport its party on a recent "Good Fellowship Tour" to Wildwood and Atlantic City.

### Substitution of Buses Being Approved

Permission has been granted the Morris County Traction Company by the Borough Council of Wharton, N. J., to substitute buses for the electric railway in the borough. The terminus, however, will not extend northward beyond the Central Railroad station, which is two blocks farther than the present terminal. The railway had asked permission to extend its lines to North Main Street, in the Luxemburg section, but residents of that section affirmed, in a petition, their belief that the present bus service given by F. B. Sheldon & Son is satisfactory. A 5-cent fare was proposed by the railway as an incentive to permit the extension of the line to Langdon's corner.

With one or two exceptions all communities along the railway have approved the change of transportation and within a few months it is likely buses will be in operation over the entire length of the old railway route.

### Long Island Utility Should Be Preserved

The Public Service Commission denied on March 25 the petition of the Northport Transportation Company, Inc., for a certificate of public convenience and necessity for a bus line between Halesite and Huntington Station, Long Island, N. Y. The petitioner is now and has been for some time operating a bus line about 8 miles long from Vernon Valley, Northport and Cole Spring Harbor. The proposed route is about 3 miles long and directly competes with the Huntington Traction Company, which opposed this petition.

Investigation by the commission's engineers revealed that the tracks and equipment of the traction company were well maintained and in safe condition to operate; some maintenance work, however, was required. At the hearing it developed that bus transportation service rather than electric railway service was preferred by many residents. Under a special act passed by the Legislature in 1926 authorizing the substitution of bus service for the electric railway with the consent of the local authorities, the railway secured such consent. The commission in denying the bus petition ruled that competition on this line, if permitted, would mean that neither company would be able to operate with financial success and probably the existing utility would be destroyed.

## Prospective Competitor in Buffalo Heard

Ernest M. Howe of the Buffalo Motor Coach Corporation, which is seeking a certificate of convenience and necessity from the New York State Public Service Commission for the operation of four bus lines in Buffalo, outlined details of the company, its financial status and its proposed plans at a series of hearings before Commissioner Pooley in Buffalo.

Mr. Howe said the new bus company will start operations with approximately $325,000 in assets, against $250,000 in subscribed capital. He said there will be an unfunded debt of $75,000. The company expects to operate 1,000,000 bus-miles annually with an average passenger pick-up per bus-mile or five or more passengers at an 8-cent cash fare. On that basis the minimum number of passengers carried annually, Mr. Howe said, would be 5,000,000. The estimated operating costs per mile, figuring in 20 per cent depreciation of vehicles, supervision and other items, would be 32 to 32½ cents per bus-mile. Mr. Howe said the company will buy 25 buses at $10,000 each, paying down $175,000.

After reviewing the railway situation in general President Youngbluth of the International Railway said in substance:

Buffalo is in the same case with many other cities, and International Railway has the same troubles and problems faced by almost all other systems. Things are getting a little better, generally and locally. In 1926 this system, for the first time in many years, earned its depreciation reserve.

Now comes the Buffalo Motor Coach Company proposition. Any independent bus system, of necessity, must be competitive, and this one would be highly competitive. It was laid out so that its three lines would reach one-fourth of the city population. Of course, it could not serve that population without connecting and cross-town lines. Mr. Howe estimates that it will take in at least $400,000. Whatever it takes in will be subtracted from International Railway, because this proposed competition will not generate new business of any appreciable amount.

If the community wants a railway system, and in the present state of the transportation industry it is certain that the city needs such a system, it cannot afford to expose that system to ruinous competition which robs it of the most profitable business. Short, straight rides, without transfers, are the rides which make money. These rides are the ones which the Buffalo Motor Coach Company plans to take away.

Co-ordinated service of railway and bus, with one fare and universal transfer, is better than cut-throat competition and two fares for one ride. It is not possible to have one good city-wide service with competition for the part of the business that absorbs losses and furnishes profits.

## Substitution Decision Rests with Marinette

Substitution of bus service for railway service looms in Marinette and Menominee. At the hearing recently held in Marinette by the Wisconsin Railroad Commission to ascertain the extent to which the Menominee & Marinette Light & Traction Company would be willing to share in the cost of new bridges over the Menominee River between the Twin Cities, J. P. Pulliam, vice-president and general manager of the company, disclosed that street railway service was supplied at a loss of $80,000 last year in Marinette and Menominee. This makes the total operating deficit close to $500,000 since the company purchased the system. In the light of these disclosures and the additional explanation that any attempt to recoup these losses through increased rates would require prohibitive fares, discussion at the hearing switched to the substitution of buses as the facts submitted clearly indicated the company's inability to share in the cost of the new bridges. On this point Mr. Pulliam declared that the company would gladly surrender any railway or bus rights it has in these cities, but if some common ground could be reached by all parties the company would be willing to contract to maintain bus service in and between the two cities.

It will be recalled that the ELECTRIC RAILWAY JOURNAL reported in its columns a few months ago that the City Council of Marinette rejected the proposal of the company to substitute bus service on a four months trial basis, railway service to be restored if the change did not meet with approval.

## Profit-Sharing for Fifth Avenue Employees

Directors of the Fifth Avenue Coach Company, New York, have approved the principle of profit sharing and the installation of a profit-sharing plan for the benefit of the employees has been authorized. Under a plan effective April 1, 1927, 10 per cent of the net income from the transportation business will be allotted to employees at the end of the year as follows:

1. To present employees who are still in service Dec. 31, 1927.
2. To persons hereafter employed who are still in service on Dec. 31, 1927. Such new employees, however, must serve three months before they begin to participate in the profits.

To give an idea of what this arrangement means, 10 per cent of the net earnings from the transportation operation as applied to the last three years would have been

$115,000 in 1924
115,000 in 1925
97,000 in 1926

Under present conditions approximately 1,850 men will benefit.

The officers, executives and heads of departments will not share in the 10 per cent of the profits above mentioned.

The company says:

The management recognizes that the present high character of its service is due in large part to its employees. Their deep interest in their work is reflected in a very low annual labor "turnover." By this plan each man by doing his part well can increase the patronage of the company, heighten the usefulness of the service to the public and at the same time increase his own earnings.

Further studies, now under way, will be completed about April 15.

## Substitution in Eugene Unlikely

Despite the fact that the Oregon Commission some time ago granted an application of the Eugene Street Railway to substitute service by bus for electric railway service, there has been no noticeable decrease in the operation of the railway. Reports filed with the commission indicate, in fact, that more cars are being added to the service and that patronage has improved greatly since the announcement of the proposed change to motor vehicles. In the event of continued fair patronage, officials state that railway service in Eugene will not be discontinued.

## More Bus Substitutions in Westchester

Abandonment of railway lines and the substitution of buses in southern Connecticut and Westchester County are sought in petitions which the New York, New Haven & Hartford Railroad and affiliated companies are preparing to file with the Public Utilities Commission. Everett Miller, president of the New York & Stamford Railway, disclosed that the petitions were to be filed as "the result of negotiations initiated nearly a year ago by the Traffic Commission of the Greenwich Chamber of Commerce." The New York & Stamford uses an interstate railway line which, in part of its territory, leases and operates lines owned by the petitioners. This company had announced that on April 3 the railway operating locally in Portchester would be abandoned and buses installed sufficient to afford a twenty-minute service. It is understood that if the petitions are granted the companies will cancel their present leases with the New York & Stamford Railway and will release their rights-of-way to this company for the motor coach routes.

**Seeks Interurban Substitution.**—The Mesaba Railway, Virginia, Minn., is planning to abandon its line between Gilbert and Hibbing as authorized by the federal court. At present public conveyances between the two towns are a rail and a bus line. Committees representing eleven range towns are seeking assurance from the Mesaba Railway Coach Company that transportation facilities will be adequate after the rail line has been abandoned. The bus and railway line are jointly owned.

**Bus Operation Results in Loss.**—Operation of buses in and between Superior and Duluth failed to net a profit for the Duluth Street Railway during 1926, according to the report filed with the Wisconsin Railroad Commission on the activities of the Superior-Duluth Coach Company, a subsidiary. The report revealed a loss of $6,379 last year. Operating revenues were $101,679 and expenses $103,256, a loss of $1,577, to which must be added taxes of $4,802. Operating expense covered $10,486 in bridge tolls for the use of the interstate bridge between Superior and Duluth. If the company had been relieved of this expense, the profit in 1926 would have been $4,089.

**Will Continue Bus Operation**—Despite reports that the New England Transportation Company would take over buses now operated by the Worcester Consolidated Street Railway, Worcester, Mass., Howard R. Whitney, vice-president of the railway, said his company would continue to operate the lines where they have developed the business. The railway will continue to operate in the sections where bus and railway service have been given.

**Bus for Churchgoers.**—The Boston Elevated Railway, Boston, Mass., has established a special Sunday bus service between the Park Street subway station and the Old North Church for the accommodation of churchgoers. The service was started March 27. So popular was the idea that the bus made three trips to serve 75 passengers.

# Financial and Corporate

## $494,471 Carried to Surplus

**Market Street Railway, San Francisco, Reduces Debt $634,000—Showing Good All Elements Considered**

Operating revenues of the Market Street Railway, San Francisco, for the year 1926 remained practically the same as the previous year. Due principally to increased wages of trainmen, effective early in the year, net earnings decreased as compared with 1925. Funded debt in the hands of the public was reduced $634,000 and there was no increase in the amount of capital stock outstanding. No dividends were paid. Capital expenditures during 1926 were $244,564. The sum of $1,346,243 was expended for maintenance of way and structures and rolling stock and equipment. A balance of $494,471 was carried to surplus.

The company operates its properties under a number of franchises, some of which expire in 1929, while others continue as long as 1952. In view of this situation the Board of Supervisors of the city and county of San Francisco has appointed a committee to study transportation problems and formulate a comprehensive program for future development.

SUMMARY OF INCOME STATEMENT OF MARKET STREET RAILWAY FOR 1926

| | | |
|---|---|---|
| Operating revenue | | $9,891,667 |
| Operating expenses and taxes except federal income tax | | 8,019,093 |
| Net operating revenue before provision for depreciation | | $1,872,574 |
| Other income | | 53,453 |
| Gross income | | $1,926,027 |
| Income charges: | | |
| Interest on funded debt | $845,148 | |
| Discount on funded debt | 53,113 | |
| Provision for 1926 federal income tax—company's estimate | 74,423 | |
| Depreciation of railroads and properties | 500,000 | |
| Other | 25,628 | |
| Total | | $1,498,312 |
| Net income | | $427,715 |
| Other profit and loss credits | | 66,756 |
| Surplus | | $494,471 |

Operating revenue for 1926 was $9,891,667, a decrease of $11,100 under 1925. The slightly reduced passenger receipts were due partly to a building trades strike, which continued through most of the year, and partly to the fact that the previous year was benefited by the celebration of California's 75th anniversary as a state.

Operating expenses, including taxes other than federal income tax, were $8,019,093, an increase of $344,285, or 4½ per cent, over 1925. This increase was mainly due to an increase in the wages of employees effective on March 1, 1926.

Thirty new cars were built in the company's own shops, and a number of others cars were remodeled to provide open-air sections in response to popular demand. During the year the company started a bus line through the rapidly growing Excelsior district.

Expenses incident to injuries and damages were 30.18 per cent less than in 1925. Statistics indicate that collision accidents per car-mile were reduced 26 per cent. This result is attributed largely to the company's policy, started during the year, of painting the front and rear ends of all cars white, and indirectly lighting them at night, to increase visibility. About one-half of the cars have been processed in this fashion and the remaining cars will be given white ends during 1927.

The company owns 773 passenger cars, operates 274 miles of single track, and during 1926 carried 265,563,016 passengers.

## Montreal Tramways & Power to Be Liquidated

A special meeting of shareholders of the Montreal Tramways & Power Company, held at Montreal, Que., on March 19, virtually marked the passing of that company from existence, a resolution being passed appointing a liquidator who will wind up the affairs of the company. Another meeting will be held on April 4, but this is merely a matter of routine to comply with the English laws, under which the company was incorporated.

Inasmuch as United Securities, Ltd., owns practically all shares of the common stock of the Montreal Tramways & Power Company, Ltd., it follows that this company will receive practically the entire stock of the Consolidated Securities, Ltd., so that United Securities, Ltd., will automatically hold the control through the new medium of the shares of the Montreal Tramways as it has done previously through the medium of the Montreal Tramways & Power Company, Ltd., the English company.

## $534,308 Profit in Louisville

**Annual Report Discloses Decline in Traffic—Company Awaits Decision on Bus Competition—Review of Matters Affecting Railway**

PASSENGER traffic on lines of the Louisville Railway, Louisville, Ky., dropped 479,705 riders in 1926 on account of an increase of about 5,000 autos. However, the company finished the year with a net profit of $534,308 against $480,557 for 1925, or an increase of $53,756. These facts were disclosed by James P. Barnes, president, at the recent stockholders' meeting.

Railway passenger traffic fluctuated through the year. January, February (when the rate was increased to a 7-cent straight fare under the terms of Ordinance No. 330, then in effect), May, June, July and September showed increases in passengers carried, which offset the decreased riding in March, April and August. The entire year showed a decrease of 479,705 passengers carried, compared with 1925, all of which decrease occurred in the last three months of 1926, due to unemployment and industrial depression. Total passenger traffic, which includes revenue, transfer and free passengers, compared with the four preceding years, was as follows:

COMPARATIVE INCOME STATEMENT OF LOUISVILLE RAILWAY

| | 1926 | 1925 |
|---|---|---|
| Operating revenues: | | |
| Revenue from transporation | $4,665,693 | $4,239,571 |
| Other operating revenues | 197,612 | 189,544 |
| Total operating revenues | $4,863,305 | $4,429,115 |
| Operating expenses | 3,275,786 | 2,962,512 |
| Net revenue from operations | 1,587,518 | 1,466,602 |
| Taxes | 461,000 | 431,000 |
| Railway operating income | 1,126,518 | 1,035,602 |
| Bus operating income | 31,566 | ..... |
| Total net operating income | $1,094,952 | $1,035,602 |
| Non-operating income: | | |
| Louisville & Interurban Railway net income | 82,903 | 88,637 |
| Other non-operating income | 10,228 | 10,432 |
| Total non-operating income | $93,131 | $99,070 |
| Gross income | 1,188,083 | 1,134,673 |
| Deductions from gross income: | | |
| Interest on bonds and notes | 651,750 | 651,750 |
| Miscellaneous debits | 2,025 | 2,366 |
| Total deductions | $653,775 | $654,116 |
| Balance available for dividends on stock | $534'308 | $480,557 |

| | 1922 | 1923 | 1924 | 1925 | 1926 |
|---|---|---|---|---|---|
| January | 7,600,072 | 7,861,986 | 8,435,464 | 8,297,839 | 8,633,543 |
| February | 6,830,188 | 7,371,936 | 7,957,906 | 7,562,261 | 7,590,218 |
| March | 7,760,463 | 8,498,345 | 8,515,182 | 8,354,832 | 8,274,959 |
| April | 7,686,732 | 8,341,493 | 8,422,780 | 8,214,226 | 8,145,383 |
| May | 8,170,426 | 8,920,188 | 8,844,856 | 8,469,877 | 8,603,531 |
| June | 8,659,721 | 8,211,428 | 8,097,217 | 7,837,978 | 7,905,530 |
| July | 7,401,345 | 7,943,088 | 7,712,320 | 7,648,982 | 7,697,183 |
| August | 7,333,738 | 7,827,996 | 7,549,678 | 7,744,573 | 7,471,624 |
| September | 7,735,517 | 8,125,974 | 7,850,813 | 7,995,353 | 8,004,341 |
| October | 7,976,451 | 8,257,865 | 8,334,069 | 8,395,428 | 8,235,552 |
| November | 7,731,835 | 8,059,261 | 7,720,786 | 8,048,480 | 7,894,275 |
| December | 8,013,257 | 8,250,837 | 8,298,196 | 8,564,736 | 8,189,721 |
| Total | 91,899,745 | 97,670,397 | 97,739,267 | 97,134,565 | 96,654,860 |

The negotiations in January, 1926, with the Board of Public Works turned largely upon certain differences of opinion with regard to construction of certain sections of Ordinance No. 330, which became effective in September, 1922, and under which the so-called barometer fund plan of service-at-cost had been carried out for three years. The differences were amicably adjusted and under the provisions of that ordinance a 7-cent fare went into effect on Feb. 1, 1926. A large and carefully planned publicity campaign resulted in

the adoption of Ordinance No. 361, Series 1926, which follows the principles of regulation embodied in the federal transportation act of 1920. Thus the city committed itself to the definite policy of a regulated transportation service at a rate such as to yield to the investor a reasonable return upon the value of property used and useful in the public service. In determination of the value of the property so used the ordinance provides for a valuation, and the Beeler Organization was selected to conduct this appraisal, a work upon which it is now engaged.

Ordinance No. 361, Series 1926, which became effective on Sept. 13, 1926, contemplates a co-ordinated bus and railway service, with motor coaches serving as feeders and connections to railway lines in territory not presently served by street cars. This service is conducted at a 10-cent bus fare with transfer to and from street cars.

MOVE TO PREVENT UNFAIR COMPETITION

On Jan. 17, 1927, an organization incorporated under the name of Peoples Transit Company started competitive bus operations. This operation competed with one of the railway's best lines and was carried on under jitney bus license. As these coaches operated between fixed terminals, on a regular schedule and over a regular route, the railway felt a franchise was necessary for their operation and suit was immediately filed for an injunction restraining the Peoples Transit Company from operating without such franchise. A temporary injunction was granted under date of Jan. 28, 1927, and operations of the competitive bus lines immediately stopped, pending decision of the Court of Appeals. The injunction has been made permanent and the case is being prepared for final argument in the Court of Appeals.

During 1926 the current dividends were paid on preferred stock, 2½ per cent on April 1 and 2½ per cent on Oct. 1. On Oct. 1, 1926, $2 a share was paid on common stock, the first dividend paid on this class of stock since July 1, 1918, and on Jan. 3, 1927, a dividend of $1 a share was paid on common stock. These dividends were paid out of the 1926 net earnings, a balance of $109,600 over and above dividend requirements being carried to the company's surplus account.

The work of the safety department in decreasing preventable accidents has progressed remarkably during the past five years, as reflected in the following figures:

STATEMENT SHOWING ACCIDENT TREND ON LOUISVILLE RAILWAY

| | 1922 | 1923 | 1924 | 1925 | 1926 |
|---|---|---|---|---|---|
| Accidents | 3,272 | 3,404 | 1,825 | 1,534 | 1,157 |
| Miles operated per accident | 3,323 | 3,380 | 6,390 | 7,432 | 10,386 |

This improvement was made in spite of the tremendous increase of motor vehicles on the streets. The safety dinners were continued throughout the year, given monthly to the carhouse operating the greatest number of miles per accident. The system average has increased from 1,800 miles per accident in 1920, prior to the start of the accident elimination contests, to 10,386 miles per accident in 1926. Two hundred and sixteen employees operated during 1926 without an accident, compared with 179 in 1925 and 136 in 1924.

Of the 1,634 employees of the Louisville Railway, the Louisville & Interurban Railroad and the Kentucky Carriers, Inc., on Dec. 31, 1926, 1,320 were enrolled in the Co-operative Association. There was a decrease in death and sick benefits in 1926 compared with 1925, as indicated in the following tabulation:

| | 1925 | 1926 |
|---|---|---|
| Death benefits paid | $8,250 | $6,300 |
| Sick benefits paid | 13,243 | 12,789 |
| Nursing service | 514 | 458 |

There was added to the surplus of the association during the year $9,904.

In his report Mr. Barnes referred to the Anthony F. Connelly award, established in 1925, in memory of Anthony F. Connelly, chief inspector, who died on Dec. 3, 1925, with a service with the company extending over 50 years. This award brought forth 50 nominations for the award, as outlined in the 1925 annual report. From these 50 names the Connelly award committee selected three employees whose records were of outstanding merit. George W. Kenn, a conductor at Thirteenth and Main carhouse, was awarded the Anthony F. Connelly award gold medal and $75 in cash, which is furnished from the fund set up by one of the directors of the company, and a trip to the annual American Electric Railway Association convention at Cleveland, Ohio. Two other employees were given bronze medals of honorable mention. Announcement of the winner for 1926 will be made in the near future.

Other subjects listed and discussed by President Barnes in his report are power, way, overhead department, jitneys, grade crossing elimination and equipment.

## Sale at Foreclosure Ahead for Morris County Traction

Application will be made soon to the federal court for permission to sell the property of the Morris County Traction Company, Morristown, N. J. Elmer King of Morristown, counsel for the receivers of the company, will make the application before Judge Runyon. The sale plan was mentioned by Mr. King in opposing a motion to direct the receivers to pay a judgment. Mr. King said there were no funds with which the receivers could pay the claim. In the sale and reorganization of the company it is planned to convert it into a bus line. Forty-two buses, costing more than $400,000, are expected to be used. The road has been in the hands of Joseph P. Tumulty and Joseph K. Choate as receivers for four years. The progress of the plan to change to buses is discussed elsewhere in this issue.

## U. G. I. Buys Into the National Public Service

Announcement has been made that the United Gas Improvement Company, Philadelphia, Pa., has acquired a minority interest in the common stock of the National Public Service Corporation, control of which passed recently from the Fitkin interests to Day & Zimmermann and their associates. Despite the construction placed on this event in some of the daily papers, there is no change involved from the status of affair with respect to this company reflected in the article in the ELECTRIC RAILWAY JOURNAL for March 19, page 553. Day & Zimmermann will continue through the General Engineering & Management Corporation to manage and operate the properties included in the National Public Service group.

## Terms of Sale of Coral Gables Road Approved

The Florida Railroad Commission recently approved the sale of the Coral Gables Rapid Transit Corporation and all its properties to the city of Coral Gables, Fla. The sale was conditioned upon the assumption by the purchaser of all fines, dues, obligations and liabilities of the company. The purchase price was given as $1,782,000. Reference was made to the sale in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 19, 1927, page 359. According to City Engineer Friedman, the extension of the Coral Gables Rapid Transit System has been completed into central Miami. The line eventually will be extended to the proposed Seaboard Railway station.

## Dividend Omitted by Chicago City Railway

Omission of the regular quarterly dividend by the Chicago City Railway of 1½ per cent on the capital stock was announced in a letter to stockholders from Leonard A. Busby, president, on March 27. The dividened of $1.50 per share is payable on April 1, but the board of directors at a recent meeting decided to defer action, due to the unsettled relations of the company with the city.

Among the reasons for this action, the letter stated, is the fact that the operating rights under the company's franchise expired on Feb. 1, and while an extension of six months has been granted by the city, the agreement can be terminated on 30 days notice.

Another difficulty, the statement points out, is "the question of enabling legislation necessary to bring unification of the traction properties and to enable the city to grant a modern type of franchise, which is still pending in Springfield. Our first mortgage bonds, amounting to $33,926,000, are past due and unpaid. In this situation the board felt that the declaration of a dividend at this time would not be warranted."

As the company now is situated, it is impossible either to refund or extend the period of the life of the funded debt.

Last year the company earned 10.15 per cent on the capital stock, the closing year under the old franchise being

the best in the history of the Chicago traction properties from the standpoint of both revenue and traffic handled. The Chicago City Railway paid off its $786,744 in bank loans and the profit and loss surplus was increased to $4,074,987.

In conclusion, the latter said:

We wish to assure stockholders that the earnings of the company, over and above our first mortgage bond requirements, will be conserved for their benefit.

The Chicago City Railway operates all the south side lines composing the Chicago Surface Lines system.

## Reorganization Committee Reviews Kansas City Affairs

Affairs of the Kansas City Railways, Kansas City, Mo., are discussed in a circular addressed by the reorganization committee to the holders of deposit for first mortgage 5 per cent bonds, three-year 7 per cent collateral notes and two-year 6 per cent collateral notes. Much of the information contained in the circular recapitulates news of the events in connection with the reorganization recorded from time to time in the ELECTRIC RAILWAY JOURNAL. It has seemed well to repeat at this time the fact that under the terms of the reorganization plan the preferred stock and the common stock issued by the Kansas City Public Service Company, the successor company, have been deposited under a voting trust agreement dated July 1, 1926, and extending for five years. Voting trust certificates in temporary form are in process of issuance for ultimate distribution to depositors.

On the subjects of rehabilitation, litigation and distribution of securities the circular says:

Since taking over the property on Oct. 15, 1926, substantial progress has been made in the rehabilitation and improvement program. Approximately 10 miles of track on important trunk lines has been completely rebuilt, together with new concrete foundations and paving. The elevated railroad in the so-called "West Bottoms," condemned as unsafe and abandoned in 1923, is being restored as a combined elevated and surface line, with necessary inclines, thereby giving much needed service to the industrial district along the Kaw River. The rolling stock is being thoroughly reconditioned, and numerous other improvements installed over the system. This work should show substantial results in 1927 and subsequent years through decreased costs and increased earnings.

There is now pending in the federal Circuit Court of Appeals for the Eighth Circuit, four appeals by junior bondholders, other creditors and stockholders from various decrees of the court entered in the receivership proceedings. The preferred stockholders and the holders of certain notes have appealed from the final decree of foreclosure, and the second mortgage bondholders and preferred stockholders have appealed from the decree confirming sale.

In view of the franchise situation and the pending litigation, the committee has deemed it inadvisable to proceed to an immediate distribution of the new securities (bonds and preferred and common stock, or voting trust certificates therefor) provided for depositors in the plan of reorganization, but anticipates that such distribution can be properly accomplished during the next few months, together with such interest and dividends as may have been paid thereon in the interim. It is expected that the new bonds issued in reorganization will be dated and will bear interest from July 1, 1926, or, if dated later, will carry warrants entitling the holder to an amount of cash equivalent to interest at the rate of 6 per cent on the principal amount from July 1, 1926, to such later date.

## $105,968 Increase in West Penn Net

### System Near Pittsburgh Does Well—Marked Progress Made in Reducing the Funded Debt

Net income of the West Penn Railways, Pittsburgh, Pa., for the year ended Dec. 31, 1926, was $2,604,331 compared with $2,498,363 for the previous year. In general, the year's operations were most satisfactory. A. M. Lynn, president, explains that the revisions of line and other improvements made during recent years enabled these results to be achieved, in some instances having reduced the number of cars without change in headway. Proposed revisions in line, rehabilitation of tracks and installation of improved signal systems are expected to result in further improvements in service. The general tendency of the public to relieve electric railways from burdensome franchise obligations, particularly as they appertain to maintenance and replacement of paving, is becoming more pronounced. The company has under negotiations franchises in many municipalities which will no doubt result in substantial relief.

CONSOLIDATED INCOME ACCOUNT OF WEST PENN RAILWAYS EXCLUDING INTER-COMPANY ITEMS

| | 1926 | 1925 |
|---|---|---|
| Gross earnings from all sources | $22,157,054 | $20,206,221 |
| Operating expenses, including maintenance, taxes and rentals | 11,594,947 | 11,169,278 |
| | $10,562,107 | $9,036,942 |
| Less: | | |
| Interest and amortization | 3,690,278 | 3,375,715 |
| Preferred dividends of subsidiary | 1,173,152 | 909,195 |
| Income applicable to minority interest | 1,092,500 | 587,889 |
| | $5,955,931 | $4,872,800 |
| Balance | 4,606,175 | 4,164,141 |
| Reserved for renewals, replacements and depletion | 2,001,843 | 1,665,778 |
| Net income | $2,604,331 | $2,498,363 |

The co-operation of the State Highway Department in Pennsylvania has made possible in several instances the removal of tracks to private right-of-way alongside highways, resulting in safer operation, more economical maintenance and improved service and running time.

Freight service between Pittsburgh and important coke region towns, started in 1924, is growing to be an important factor in the company's revenues. In addition to the larger and more adequate freight house erected in Greensburg, improvements have been made to facilities in Uniontown, Pa.

The use of the "Sunday pass" for long interurban rides, first adopted in 1925, has been extended and placed on a permanent basis. Weekly passes for local city service have also been started. Both of these show very satisfactory results. The company has entered into the bus business in certain localities where service can be undertaken and rendered supplementary to the railway lines.

In July, 1926, the company consummated its agreement made in 1916 by the sale of Connellsville power station to the West Penn Power Company. The proceeds of this sale were placed with the Equitable Trust Company, New York, trustee of the first mortgage of April 1, 1905. The trustee called for tenders and retired to Dec. 31, $1,497,500 of 5 per cent first mortgage gold bonds of the company, due Jan. 1, 1931, leaving on hand for further redemption of bonds the sum of $1,496,300. Mr. Lynn explains that if further purchases can be made at satisfactory prices, the company will continue to redeem bonds to the exhaustion of the fund, temporarily invested in United States government obligations, with any balance utilized for improvements and extensions of its physical properties.

On Sept. 1, 1926, the company called and retired all of its outstanding three-year 6½ per cent gold debentures, due April 1, 1927, aggregating $3,500,000, funds having been made available to its treasury through reimbursement by certain subsidiary companies to which temporary advances had heretofore been made for construction, now funded. All of the company's outstanding first equipment trust 8 per cent notes of 1921, aggregating $120,000, were retired on Oct. 1, 1926.

During the year there were purchased $102,000 principal amount of 5 per cent first mortgage gold bonds of the Pittsburg, McKeesport & Greensburg Railway, now a direct obligation of West Penn Railways, reducing the amount of these bonds outstanding in the hands of the public to the sum of $271,000. The company also purchased through the trustee $7,000 principal amount of first mortgage 5 per cent gold bonds of West Penn Traction Company, issued under first mortgage of that company dated June 1, 1910. The amount of these bonds now outstanding has been reduced to $4,847,000.

As they matured from time to time during the year the West Penn Railways retired or purchased and retained in its treasury the following bonds of the Wheeling Traction System:

| | |
|---|---|
| Wheeling Traction Company five year 8 per cent Wheeling Bridge collateral gold notes (retired) | $90,000 |
| Twenty-year 5 per cent first mortgage gold bonds of the Wheeling & Western Railway ($2,000 yet to be presented) | 182,000 |
| Twenty-year 5 per cent first mortgage gold bonds of the Bellaire-Southwestern Traction Company | 50,000 |
| | $322,000 |

Mr. Lynn points out that the retirement of $5,548,500 of funded obligations of the company and its subsidiary railway companies during the year 1926, in almost all instances in anticipation of their maturity, will prove to be of advantage in handling its financial affairs in future years.

**Refunding Plan in Cincinnati.**—The Cincinnati Street Railway, Cincinnati, Ohio, is said to be arranging to refund an issue of $4,500,000 short term notes and supplant them with long term bonds. The notes are of three years duration and pay 6 per cent interest. The bonds are to bear a rate of interest lower than the notes, but it is expected that their longevity will attract note holders and other investors.

# Legal Notes

INDIANA.—*Company Suspends Uninsulated Wire at Peril.*

The electric company owned and operated a line of poles along a public highway, on which were strung bare uninsulated wires carrying 6,000 volts. Plaintiff was engaged in moving his house along the highway and in order that the house might pass under certain guy wires which were not far enough from the ground to permit passage of the house, he climbed on the roof and accidentally came in contact with one of the uninsulated electric wires which was about 3 ft. above the guy wire and roof of the house, thereby receiving an electric shock which resulted in a serious injury. Under the state law the defendant is required to provide full and complete insulation of wires transmitting electricity at points where the public is liable to come in contact with such wires. It was held that in suspending an uninsulated wire across the highway the company does so at peril, and judgment for p'aintiff was affirmed. [Linn Grove L. & P. Co., vs. Fennig, 154 N. E., 877.]

MARYLAND. — *Carriers — Taxation of Easements.*

Street railroad's right in street is an easement, subject to taxation, but in fiixing the value of such easement in street for purpose of rate basis, the Public Utilities Commission cannot consider such value as is dependent on use to which franchise of corporation permits easement to be put. [Miles vs. West, et al, 135 Atl., 579.]

MICHIGAN.—*Plaintiff Was Allowed to Express Views.*

In an action against the street railroad for personal injuries and damages to auto struck by street car, plaintiff was properly permitted to express opinion as to the speed of the street car, under evidence showing he saw the car when he turned on the track, and also showing that he had driven automobiles for some time. [Mills vs. Michigan Elec. Ry. Co., 212 N. W., 75.]

MINNESOTA. — *Fog Should Prevent Usual Speed of Car.*

A single track of the railway company was laid west of the center of the road. A northbound car, traveling at its usual speed through a heavy fog, struck a southbound auto, killing two of its occupants. A verdict in behalf of the next of kin of one of the occupants was affirmed, the court stating that weather conditions often demand increased vigilance on the part of those who use highways not only for their own but for the safety of others, and under the above conditions it was negligence for the operator of the trolley car to travel at the usual speed. [Kimpell vs. Duluth St. Ry., 211 N. W., 955.]

NEW JERSEY. — *Truck Helper Was Guilty of Negligence.*

Plaintiff was a helper on a truck proceeding on a road where there were tracks on both sides of the highway. A trolley was going in the same direction. Driver of truck drew it up alongside and quite near the trolley road on the right side. The plaintiff jumped off the truck and was immediately struck by the trolley car. Held that plaintiff was guilty of contributory negligence and verdict in his favor set aside. [Markowski vs. P. S. Ry. Co., 135 Atl., 783.]

NEW YORK.—*Receivership Does Not Exempt Street Railroads from Penalties.*

A street railroad corporation is not exempt from penalties for failing to pay certain percentage of gross income to city as required by its contracts under Railroad Law, N. Y. Sect. 175, because it is operated by a receiver appointed by the court. [City of New York vs. Brooklyn, Q. C. & S. R. Co., 219 N. Y. S., 399.]

NEW YORK.—*Stock Ownership Is Insufficient to Hold Dominant Company with Liability for Injuries of Subsidiary.*

Plaintiff was injured while leaving a car, through the negligence of the motorman. The franchise to operate a street railroad along the route on which the car was traveling belongs to the 42d Street, Manhattanville & St. Nicholas Avenue Railway. Substantially all of the stock of that company is owned by the Third Avenue Railway, which has its own franchises along other streets. An attempt was made to hold the latter company liable for the injury on the theory that under the screen of this subsidiary and others it operates for itself the entire system of connected roads, and is therefore liable for the torts of the consolidated enterprise. Held that stock ownership alone is insufficient to charge dominant railroad with liability for torts of the subsidiary. [Berkey vs. Third Ave. Ry., 155 N. E., 58.]

NEW YORK —*Power of State in Rate Fixing Defined.*

A state, through its proper agencies, has power to increase or lower rates charged by public service corporation, notwithstanding the existence of a contract providing for lesser or higher rate, and exercise of that power does not violate state or federal constitution. [Niagara, Lockport & Ontario Power Co., vs. Seneca Iron & Steel Co., 219 N. Y. S., 418.]

OHIO.—*Injuries at Safety Zones.*

A ten-year-old girl, standing in a safety zone, was struck by the rear end of a trolley car which was passing her. The allegations of negligence were that the car was going at a high rate of speed; that the motorman failed to ring his gong, and that the car did not stop in time to avoid the accident. There was no allegation that there was any projection on the rear of the car which might have produced the injury. Testimony showed the child had seen the car approaching, and it was accordingly held that recovery could not be based on the failure of the motorman to ring his gong and that such allegations were not therefore material. [Steinman vs. Cleveland Ry., 155 N. E., 149.]

OHIO.—*Casual Service Not Proper Subject of Certificate of Convenience and Necessity.*

A bus company received from the Public Utilities Commission a certificate of public convenience and necessity to operate motor transportation passenger service on irregular routes, "over all public highways, roads and streets in the state of Ohio." The law requires publication of all applications for such certificates in a newspaper of general circulation, published at the county seat of each county through which the applicant proposes to operate, or in a newspaper of general circulation throughout the territory in or through which the applicant proposes to operate. Publication in five newspapers issued in different parts of the state was held by the Commission to be "substantial compliance" with this part of the law, but it was held inadequate by the Court. The Court also held that such a certificate over highways already traversed by regular routes is unauthorized, where it is not shown that the regular lines in that section are not furnishing reasonable facilities and that casual and unusual service of the kind proposed is not proper subject matter of a certificate of public convenience and necessity. [Lake Shore Electric Railway vs. Public Utilities Commission of Ohio and other cases. 154 Northeast. Rep., 239.]

OKLAHOMA.—*Bus Line Must Justify Certificate of Convenience and Necessity.*

To warrant licensing of additional public utility, it must appear that present facilities are inadequate and inconvenient to traveling public. That proposed bus line, serving same territory as railroad, may accommodate few individuals, does not justify certificate of "convenience and necessity." [Chicago, R. I. & P. Ry., vs. State, 252 Pac., 849.]

PENNSYLVANIA. — *Expert May Testify on His Own Examination.*

A medical expert may testify as to symptoms and sensations narrated by patient for the purpose of securing correct diagnosis and give his professional judgment as to the effects of injury, based on his own physical examination of injured party, but not on what others have told him, though he was fully advised of history of case. [McMinis vs. Phila. Rapid Transit Co., 135 Atl., 722.]

PENNSYLVANIA. — *Pedestrian Should Cross Street Only When Action Does Not Seem Hazardous.*

A young man in full possession of his faculties was held guilty of contributory negligence as a matter of law, barring recovery for injuries sustained as a result of stepping in front of a moving street car which was in plain sight in broad daylight, with nothing to obstruct his view or distract his attention when he started across the street from a wagon on the opposite side. A pedestrian may properly attempt to cross a street car track on which a car is approaching when there appears to be sufficient opportunity to do so safely, but not when to do so appears hazardous. [Schuchalter vs. Phila. Rapid Transit Co., 135 Atl., 739.]

# Personal Items

## R. B. Stearns Honored

**Operating Head of Eastern Massachusetts Company Made President of New England Club**

Because of his outstanding accomplishments in the West, especially in Milwaukee, R. B. Stearns received a commission in the East ten years ago as vice-president in charge of operating one of the important systems in Massachusetts. And now he has just been elected president of the New England Street Railway Club. R. B. Stearns, vice-president and general manager of the Eastern Massachusetts Street Railway, certainly is well known in New England and is recognized as an important influence in general utility enterprise.

R. B. Stearns

In the summer of 1917 he was elected senior vice-president in charge of operation of the Bay State Street Railway in Boston, to become in 1919 the Eastern Massachusetts Street Railway, relinquishing his position as vice-president of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis. At that time P. F. Sullivan, president of the Bay State property, said that Mr. Stearns had been asked to join the Bay State because of the conspicuously successful work he had done in the West. In Milwaukee he had charge of a property with 400 miles of track, doing a business then in excess of $6,000,000 a year. In his six years of service with the Milwaukee company he had done a great deal toward rehabilitating and reconstructing the property. In addition he had started the Employees' Mutual Benefit Association and other employee benefit associations looking toward the development of the co-operative spirit.

### Mr. Stearns' Early Work

Prior to his affiliation with the Milwaukee property, Mr. Stearns had been actively engaged in work in Chicago. He was employed in the construction of the Northwestern Elevated Railroad, the Union Loop and extensions to the Lake Street Elevated Railroad, Chicago, later known as the Chicago & Oak Park Elevated Railway, as assistant chief engineer and superintendent of construction. After that, he was appointed chief engineer and superintendent in charge of the operation of the Northwestern Elevated Railroad. At one time he was general manager of the Chicago & Milwaukee Electric Railroad.

Mr. Stearns was graduated from Purdue University, class of 1889. He was engineer in connection with the Columbian Exposition in Chicago in 1893, and subsequently was engaged in the United States Engineers Service on the Chicago drainage canal and the Hennepin Canal.

A decade ago, when Mr. Stearns went to Boston, the roads there were in a somewhat perilous state. What was needed, many felt, was a broad view of the railway question, followed by legislation to the end that electric railway investment might again become attractive to capital. The hope was expressed that Mr. Stearns' entry in New England would help the railway companies in the solution of their problems. He at the very beginning urged the railway companies to co-operate, and stressed particularly the assistance which the trainmen could give in explaining the needs of the railways to the public. He introduced the zone fare system on the Bay State lines.

## Adolf Blunk Leaves St. Joseph

Adolf Blunk, associated with the St. Joseph Light, Heat & Power Company, St. Joseph, Mo., since November, 1925, and for the past year general superintendent of the railway department, was transferred recently to the Toledo Edison Company. His change is in the nature of a promotion, although his duties with the Toledo Edison have not been specified.

Mr. Blunk first worked for the Union Pacific Railroad in the maintenance of way department. Then he went to the Toledo Railway & Light Company, as junior engineer. It was at this time in his career that the war broke out and he entered the military, becoming first lieutenant in the army air service. After the armistice Mr. Blunk returned to the Doherty organization as railway engineer with the Durham Public Service Company, Durham, N. C. Then for a time he was with the Toledo & Western Railway, Sylvania, Ohio, as master mechanic, trainmaster and purchasing agent. His next post was with the Ohio Public Service Company, Mansfield, Ohio, as railway engineer and superintendent of the gas department. The Portsmouth Public Service Company, Portsmouth, Ohio, claimed him next, and from there, following a short stay in the New York office, he went to St. Joseph, taking the position as assistant general superintendent. In February, 1926, he was made general superintendent of the railway department. Mr. Blunk was educated at the University of Nebraska.

## Niles Persons Goes to Brooklyn

Niles Persons, who for the past four years has been master mechanic of the Schenectady Railway, Schenectady, N. Y., has accepted a position with the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., with the title of superintendent of surface lines shops. In this capacity he will fill a new opening in the mechanical department, reporting to W. G. Gove, superintendent of equipment. The new position was made necessary on account of the rapid expansion of the system and the need for directing surface maintenance work as a complete unit separate from rapid transit work.

Mr. Persons' first connection in electric railway work was in the armature department of the United Traction Company, Albany, where he remained for thirteen years as foreman, general foreman, assistant master mechanic and master mechanic. He has also been in charge of the mechanical department for the Hudson Valley Railway, Glens Falls; New York State Railways, Rochester; Gary & Interurban Railway, Gary, Ind., and the International Railway, Buffalo.

Niles Persons

Mr. Persons was born in Albany in 1888. He was educated in the public schools of that city and at the State Normal School. He is a member of the New York Electric Railway Association, American Electric Railway Association and the Schenectady Chamber of Commerce.

## Thomas Miller Promoted in Schenectady

Following the resignation of Niles Persons as master mechanic of the Schenectady Railway, Schenectady, N. Y., Thomas Miller, formerly assistant master mechanic, succeeds to the vacated post. Mr. Miller's present position will be filled by William Golden, long identified with the Schenectady Railway shops.

Mr. Miller's first experience with railway work was gained with the Quincy & Boston Railway as an electrical inspector. He was connected at one time with the Bay State Street Railway as foreman and general foreman and later served the New York, New Haven & Hartford Railroad as general foreman of electrical operation at Pemberton, Mass. Mr. Miller went to Schenectady in 1910 as general foreman of the McClellan Street carhouse and has since held positions as general foreman and assistant master mechanic. Mr. Miller was born in Preston, England, in 1879.

## Oklahoma Association Elects E. R. Ernsberger

Earl R. Ernsberger of Oklahoma City, Okla., president of the Southwestern Light & Power Company, was elected president of the Oklahoma Utilities Association on March 9. For many years Mr. Ernsberger has been what is known as an electric light and power man, but he will be recalled to railway men as the former chief engineer and general manager of the Mount Hood Railway & Power Company, Portland, Ore. This was an electric railway and hydro-electric power development. Mr. Ernsberger went with this property just after the construction was started, and completed that work and operated the property until it was sold to the Portland Railway, Light & Power Company in 1913.

E. R. Ernsberger

This, however, was not his only railway connection, for in 1913 he went with the Charles City Western Railway, Charles City, Iowa, as vice-president and general manager. During Mr. Ernsberger's management the road was electrified, extended and put on a paying basis and operated as such until the time he severed his connection with it in January, 1922. It was from this property that he went in February, 1922, as president and general manager of the Southwestern Cities Electric Company, a holding organization for the Lawton & Duncan Electric Company, Mangum Electric Company and the Lawton Gas Company in Oklahoma, and the Quanax Light & Ice Company, operating in Texas, also the Pecos Valley Gas & Electric Company in New Mexico. These are all properties now included in the Southwestern Light & Power Company. He is also president and general manager of the Keyes Corporation, owning and operating oil and gas fields at Walters, Okla.

Mr. Ernsberger's experience has covered a wide range of engineering activity. The project at Portland, Ore., to which reference has been made before, consisted of the 20,000-hp. hydro-electric plant at Bull Run, with a 500-ft. head. The work there included the building of 3 miles of tunnel conveying the water from one river to another, 5 miles of flume with a 280-acre reservoir reserve with two auxiliary steam plants in Portland, 66,000-volt high-tension transmission lines and a 20-mile railway which had to be built before the machinery could be transported to the power plant site and installed.

Mr. Ernsberger is a graduate civil engineer. His first experience after leaving school was with the Pennsylvania Railroad in the engineering department with headquarters at Pittsburgh. He left that company to accept a position as assistant to the chief engineer of the Wheeling & Lake Erie Railroad, Cleveland, Ohio, but later became engineer and superintendent of track elevation for the Chicago, Milwaukee & St. Paul Railway in Chicago. This last position he held for eight years, during which time several million dollars worth of construction work was done under his direction each year. As a part of his work at Chicago Mr. Ernsberger helped supervise the electrification of the Northwestern Elevated Railroad from Wilson Avenue to the Central Street Station in Evanston, Ill.

Mr. Ernsberger was a pioneer among utility men with engineering training who recognized the value of good public relations. The very nature of his work has compelled him to be exact in his dealings, but the practice of the Golden Rule has been his motto, with the result that he has found in all cases that the public in turn has treated the property which he represented as it would like to be treated.

## Changes at International Annual Meeting

T. E. Mitten was elected chairman of the board of directors of the International Railway and J. A. Queeney chairman of the executive committee at the annual meeting of the board of directors, held on March 28. Dr. A. A. Mitten, son of Mr. Mitten, was added to the executive committee, the other members being Mr. Queeney and President B. J. Yungbluth. Mr. Queeney becomes vice-chairman of the board.

Harold P. Lesswing was elected a director of the company, taking the place of George L. Burgain, retiring president of the I. R. Co-operative Association. Mr. Lesswing is the newly elected vice-president of that association. He was born in Tonawanda, N. Y., and has been employed by the company continuously since April, 1916. His first job was as helper in a construction gang. He is now an electrician.

The complete list of directors elected by the stockholders includes T. E. Mitten, J. A. Queeney, C. J. Joyce, Harold P. Lesswing, Dr. A. A. Mitten, W. E. Murphy, Nelson Robinson, H. G. Tulley and B. J. Yungbluth.

## G. W. Welsh Heads Illinois Association

G. W. Welsh, vice-president of the East St. Louis & Suburban Railway, East St. Louis, Ill., was elected president of the Illinois Electric Railways Association at the meeting in Springfield, March 17. A little more than a year ago, when W. H. Sawyer, president, departed for Australia for the purpose of making the electrical survey, Mr. Welsh was elected vice-president of the East St. Louis Railway, which included the East St. Louis & Suburban Railway and the St. Louis & Belleville Electric Railway. Before that promotion Mr. Welsh had been assistant to the president of all the railway companies in the group.

G. W. Welsh

It was in 1914 that Mr. Welsh became connected with the East St. Louis & Suburban group of properties in East St. Louis as superintendent of power. He continued in that position until 1919, when he was made chief engineer. He has been identified with the General Electric Company, the New York Central Railroad, the Southern Pacific Company at San Francisco, where he was interested in electrification work, as he was on the New York Central. Mr. Welsh was educated at Lehigh University, where he was graduated with a degree of electrical engineer in 1901.

# Obituary

## Albert Ball

Albert Ball, chief mechanical engineer of the Sullivan Machinery Company for nearly 50 years, died at his home in Claremont, N. H., on Feb. 7, at the age of 91 years and nine months. Mr. Ball was born in Boylston, Mass., on May 7, 1835. His schooling ended at the age of 16 years, when he became a machine shop apprentice. His first employment was with L. W. Pond at

Worcester, Mass. In 1863 he brought out his first important invention, a combined repeating and single loading rifle, and in the same year he perfected a machine for polishing flat surfaces. Mr. Ball was sought out by E. G. Lamson, of the firm of Lamson, Goodnow & Yale, manufacturer of the Ball gun, many of which were sold in Germany and used by the Prussian army in the war against Austria.

It was while Mr. Ball was with the Windsor firm that he invented the first cartridge greasing machine, an indirect outcome of his visit to the Springfield, Mass., arsenal for the purpose of discussing contracts for the Ball rifle. Mr. Ball went to Claremont in May, 1868, to become affiliated with the J. P. Upham & Company machine shop, which later became the Sullivan Machinery Company. It was after he became associated with the Sullivan Machinery Company that his full power as an inventor was attained. Beginning in 1869 with the diamond channeler and gadder, his genius was responsible for the development of many important improvements in mining and quarrying machinery.

Development of the Sullivan diamond core drill brought to Mr. Ball a lasting fame, and the romantic history of the opening up of the rich gold fields in the South African Transvaal is closely linked with the history of Mr. Ball's diamond drills. Mr. Ball's inventions during his life in Claremont were not limited to mining machinery.

Following his retirement from the Sullivan company in 1914, Mr. Ball turned his time and efforts to an avocation in which he had taken great interest, namely, the making of violins. He produced many instruments of beautiful design, praised by experts for their tone and finish, and developed special machinery for executing unique wood patterns. He continued active until his last illness.

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**Edward C. Niles**, former chairman of the New Hampshire State Public Service Commission, reporter of Supreme Court decisions and special counsel for New Hampshire in its railroad cases, died in Concord on Feb. 16. He was born in Hartford, Conn., on March 28, 1865.

**Fred W. Reitz**, for many years president of the Evansville Traction Company, which later became the Evansville & Ohio Valley Railway, Evansville, Ind., died recently. The Evansville & Ohio Valley Railway operates from Evansville west to Mount Vernon, east to Rockport and Grandview and south to Henderson, Ky. Mr. Reitz was 69 years old.

**Charles H. Alexander**, pioneer electric railway man of Texas, died at his home in Dallas on March 21. Mr. Alexander retired from business several years ago. He went to Dallas in 1888 from Tennessee and organized the Standard Light & Power Company and the Dallas Consolidated Street Railway. In the organization of the street railway he consolidated and electrified the lines in Dallas. His property was the first electric railway in that part of the state of Texas. Mr. Alexander was 68 years old.

# Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

## Best Year for General Electric

### Selling Prices Up Only 13 Per Cent Despite 54 Per Cent Advance in Commodity Prices

Sales billed by the General Electric Company in 1926 amounted to $326,974,104, compared with $290,290,166 in 1925, an increase of more than $36,000,000. The best previous high record was in 1924, when sales totaled $299,251,869. Orders received during 1926 aggregated $327,400,207, an increase of 8 per cent over 1925. The previous high record was $318,470,438 in 1920.

Profit available for dividends on the common stock on the 1926 business was $44,314,884, equivalent to $6.14 a share on the 7,211,481 shares of no par value stock outstanding, as compared with $20.49 a share in 1925 on the 1,802,870 shares of $100 par value common stock then outstanding, which is equivalent to $5.12 per share on the present stock. In August, 1926, four shares of no par value common stock were issued in exchange for each share of the old common stock.

COMPARATIVE STATEMENT OF INCOME AND EXPENSES OF THE GENERAL ELECTRIC COMPANY

| | 1926 | 1925 |
|---|---|---|
| Net sales billed | $326,974,103 | $290,290,165 |
| Less: Cost of sales billed, including operating, maintenance and depreciation charges, reserves and provision for all taxes | 289,878,335 | 257,479,490 |
| Net income from sales | $37,095,768 | $32,810,675 |
| Income from other sources: | | |
| Income from associated companies | $4,937,901 | $3,411,292 |
| Income from miscellaneous securities | 915,835 | 751,142 |
| Interest and discount | 3,047,048 | 2,838,513 |
| Income from U. S. government securities | 2,647,502 | 2,394,398 |
| Royalties and sundry revenue | 1,013,238 | 964,720 |
| | $12,561,526 | $10,360,067 |
| Total income | $49,657,294 | $43,170,743 |
| Less: All interest payments and, in 1925, premium on debentures retired | $436,511 | $1,925,696 |
| Addition to general reserve | 2,548,284 | 2,603,828 |
| | $2,984,796 | $4,529,525 |
| Profit available for dividends | $46,672,498 | $38,641,217 |
| Less: 6 per cent cash dividends on special stock | 2,357,614 | 1,735,576 |
| Profit available for dividends on common stock | $44,314,884 | $36,905,641 |
| Less: Cash dividends on common stock* | 19,828,896 | 14,407,544 |
| Surplus for the year | $24,485,987 | $22,498,097 |
| Surplus at January 1 | 85,848,170 | 72,362,223 |
| | $110,334,158 | $94,860,320 |
| Less: Dividends paid in special stock: $1 per share in 1926 (equivalent to $4 per share on old $100 par value stock) and $5 per share in 1925 | 7,210,810 | 9,012,150 |
| Surplus at Dec. 31 | $103,123,348 | $85,848,170 |

* At the rate of $8 per share on old $100 par value stock in 1925 and first half of 1926 and at the rate of $3 per share on new no par value stock (equivalent to $12 per share on old stock) in last half of 1926.

This split-up of shares is reflected in an increase in the number of stockholders from 36,697 in December, 1925, to 46,305 in December, 1926. More than 98 per cent of the stock is held in the United States and nearly half of the stockholders are women. Every state in the Union is represented in the list of stockholders.

A striking illustration of the company's contribution to the benefit of the consuming public and of its employees is contained in a statement showing that during the past twelve years, while commodity prices have advanced 54 per cent and the cost of living has risen 68 per cent, General Electric selling prices have increased only 13 per cent and the average earnings of the company's employees have more than doubled.

The export business of the company is conducted by the International General Electric Company, Inc. Those portions of its orders and billing which were for General Electric products are included in the corresponding figures of the General Electric Company at their cost to the International Company. The total of all orders received by the International Company during the year was $20,824,000, compared with $25,710,000 during 1925. The net sales billed were $22,696,577 during 1926, compared with $21,981,951 for 1925. The International Company's business yielded a profit available for dividends of $1,538,306 compared with $2,617,204 in 1925. Dividends of $1,500,000 were paid during 1926, of which the General Electric Company received $1,375,772, which is included in the financial statement as part of "income from associated companies."

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## Large Bus Shops Proposed at Newark

For purposes of efficiency and economy Public Service Transportation Company, Newark, N. J., will erect a large bus repair shop and remodel the present storage building on the south side of Ferry Street west of and adjoining the Newark railway repair shops. It is intended to make this shop the major repair and overhauling headquarters for all the buses operated by the company in the state.

The proximity of the bus repair shop to the railway shops is expected materially to reduce the time heretofore taken to overhaul buses, as it will be possible to make chassis and body repairs simultaneously by utilizing the facilities of both shops. Another advantage will result from placing the two main storerooms adjacent to each

other, as economies can be effected by the delivery of railway and bus supplies to the point of common activity.

All chassis and engine work will be done in the new bus shop and the electrical work, carpenter work and painting, together with spring, radiator and sheet metal work on the buses will continue to be done in the railway shops.

The bus shop will be thoroughly equipped with the latest models of machinery, making it possible to perform any major overhauling job at this point. All minor repairs to buses will continue to be made at the smaller garages in various parts of the territory.

The new bus shop will be 318 ft. long, 102 ft. wide and 26 ft. high, sufficient to accommodate double-deck buses if necessary. The roof will be of glass of special sawtooth design, constructed so that light from the north will be reflected into the working space beneath. The storeroom will be two stories.

# Trends in the Metal Markets

BUYERS of the non-ferrous metals have for the most part not responded during the week ended March 30 even when producers were willing to shade prices. Demand for copper has been slightly better than last week, but this is all that can be said for it; demand for zinc subsided and lead and tin show little change so far as volume of business is concerned.

Copper was generally available for Eastern deliveries at 13¼ cents on Thursday, Friday and Saturday, but as early as Friday reports of 13⅛ cents seem to be well authenticated. By Monday the market was generally quoted at 13⅛ cents and that price ruled on business placed March 29 and 30. The copper sold at 13.05 cents was a resale offering. In the Middle West as low as 13.20 cents, delivered, has been done. The volume of business was somewhat greater than last week, but is still much below normal. The total of March sales will be the lowest in months, so the prospect of a good buying wave in the coming week, or possibly in the week after next, seems excellent. The large producers have so far consistently refrained from forcing copper on the market, the depression in price being attributable to the custom smelters, who make a policy of selling current intake. Following recent sales, they are, perhaps, in somewhat improved position. The copper sold has been pretty well distributed. Sheet and tube business is reported active, and brass business good. Wire continues to be the dullest line. Copper prices abroad were reduced on March 29 by the export association from 13.65 to 13⅛ cents, c.i.f.; there, too, the week has been dull.

The *Engineering and Mining Journal* says that an unusual situation exists in the lead market. The peculiarity lies in the fact that the present dip has taken the price lower than the bottom reached at the end of the long decline, a condition that has not existed for many years. The market is quite clearly in the hands of buyers, and sellers are competing for business. In New York, the limited amount of "outside business" has virtually all been at the Smelting company's price. In the Middle West second-hands have been inclined to undersell the principal interests, some lead being available on March 30 as low as 7.05 cents. Absence of buying in volume by battery makers is an important feature in the situation.

Demands for zinc from galvanizers have been few and sellers have been obliged to make concessions in price. The volume of sales has been smaller than for several weeks. Prompt zinc has been offered for somewhat less than forward. On March 29, for example, early deliveries were available at 6.525 cents without being taken up, whereas a good tonnage for forward delivery sold at 6.55 cents. On March 30 the market was much the same, though some zinc was reported having been offered as low as 6½ cents. Some increase in ore production is reported from the Tri-State district, but smelter production is probably 8 or 10 per cent less than it was a month ago. High-grade metal continues dull at 8½ cents delivered in the East.

Tin has been quiet during the week, with prices fluctuating within narrow limits in the domestic market. An advance in London on March 30 was reflected in some improvement in the domestic market from a quotational standpoint. Future delivery is at a discount of from 1⅝ cents to 2 cents; and 99 per cent, for prompt delivery, commands about a cent less than Straits.

METAL, COAL AND MATERIAL PRICES
F. O. B. REFINING

| Metals—New York | March 29, 1927 |
|---|---|
| Copper, electrolytic, cents per lb | 12.90 |
| Copper wire, cents per lb | 15.25 |
| Lead, cents per lb | 7.32 |
| Zinc, cents per lb | 6.88 |
| Tin, Straits, cents per lb | 68.00 |
| **Bituminous Coal, f.o.b. Mines** | |
| Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons | $4.425 |
| Somerset mine run, Boston, net tons | 1.975 |
| Pittsburgh mine run, Pittsburgh, net tons | 2.05 |
| Franklin, Ill., screenings, Chicago, net tons | 2.25 |
| Central, Ill., screenings, Chicago, net tons | 1.875 |
| Kansas screenings, Kansas City, net tons | 2.50 |
| **Materials** | |
| Rubber-covered wire, N. Y., No. 14, per 1,000 ft | $5.50 |
| Weatherproof wire base, N. Y., cents per lb. | 16.75 |
| Cement, Chicago net prices, without bags | 2.05 |
| Linseed oil (5-bbl. lots), N. Y., cents per lb. | 10.70 |
| White lead in oil (100-lb. keg), N. Y., cents per lb | 14.50 |
| Turpentine (bbl. lots), N. Y., per gal | $0.69 |

## H. M. Robinson a General Electric Director

Henry M. Robinson, president of the First National Bank of Los Angeles, was elected a director of the General Electric Company at the meeting of the board in New York on March 25. In addition to his position with the First National Bank, Mr. Robinson is president of the First Securities Company, chairman of the board of the Pacific Southwest Trust & Savings Bank, and a director in a number of other large corporations. This is the first time the General Electric Company has gone to the West for a member of its board.

## Terms of Purchase of Seattle Cars Under Discussion Again

Negotiations for the purchase of 80 new cars for the Seattle Municipal Railway, Seattle, Wash., are being pushed by Seattle city officials. Only one or two details are yet to be worked out with the St. Louis Car Company, awarded the contract some time ago. A bond issue of $1,875,000 has been voted for the purchase, of which $1,420,000 will go for the cars and the rest for financing track extensions in various parts of the city and for a railway trestle over the West Duwamish waterway.

The car builder desires that there be included in the purchase contract, before the company signs it, a clause making a separate fund of the money to retire the bonds for buying the cars. Its desire is to be reassured that money put aside for the retirement of the bonds will be used for that purpose only. The Council sees no objection to this clause and is ready to include it in the contract as soon as the company which has agreed tentatively to buy the bonds is ready to take them. Operation of the new cars is expected to effect a saving of $260,000 a year.

## Mazda Price Cut Again

Effective on April 1, announcement is made by the General Electric Company of another reduction in the prices of Mazda incandescent lamps. This is the third reduction in prices since the new inside-frosted lamps were introduced in 1926. The reduction lowers the price of 25 and 40-watt lamps to 23 cents each, the 50 and 60-watt sizes to 25 cents each and the average price of all Mazda lamps to 49.4 per cent less than in 1914.

"This reduction is made possible by the elimination of waste through the abandoning of about 45 types of lamps and the universal acceptance of the six new types of inside frosted bulbs," the announcement said in part. "The old type of outside frosted lamp, which absorbed approximately 20 per cent of the light and collected considerable dust and dirt with the rough surfaces, sold for approximately three times as much as the new inside frosted lamp."

## Great Northern Railway Electrification Progressing

The 7,500-kva. frequency changer at Skykomish, Wash., which will supply part of the current used by the electrified Great Northern Railway has been installed, ready to supply 11,000-volt, 25-cycle, single-phase current to the overhead lines which are now being erected. A similar frequency changer is also to be located at Tumwater. Installation of the equipment for the electrification of the railroad over the Cascade Mountains is progressing rapidly, and train operation with electric locomotives is predicted in the near future.

Two single-phase, motor-generator type locomotives, each weighing 250 tons and being the largest single-unit electric freight locomotives ever built, will be placed in operation this summer. These, as well as the frequency

changers, are being supplied by the General Electric Company. The American Locomotive Company has the contract for the mechanical parts of the locomotives.

Power will be supplied to the substations by the Puget Sound Power & Light Company.

## Slingluff Goes to Kuhlman Car Company

Eugene Slingluff, well known in the car building industry, has resigned his position with the Cincinnati Car Company to accept the post of general superintendent with the Kuhlman Car Company, Cleveland, Ohio. Mr. Slingluff commenced his career in 1895 with the Baltimore Traction Company in the electrical department. The following year he went to the Westinghouse Electric & Manufacturing Company in its construction department, and a year later was connected with the mechanical department of the Washington Railway & Electric Company. He remained with that company up to 1903, when he accepted a position with the Cincinnati Traction Company, remaining in its employ until 1914. While there he was superintendent of carhouses and superintendent of shops and equipment. Mr. Slingluff went with the Cincinnati Car Company in 1914.

## *Rolling Stock*

**Monongahela West Penn Public Service Company, Parkersburg, W. Va.,** has in contemplation a program of improvements which includes among its items the purchase of eighteen cars and a quantity of buses, the number of which is still to be fixed.

**Yellow Cab Company,** recently taken over by the Twin City Rapid Transit Company, Minneapolis, Minn., has bought 25 cabs at a cost of $50,000.

**Portland Electric Power Company, Portland, Ore.,** has received all of the eight pay-as-you-enter type buses to be used on the new Ross Island bridge line. The total cost of the buses was $90,000. Seven of them are of the Yellow Truck & Coach Company make and one is a Mack.

## *Track and Line*

**Interborough Rapid Transit Company, New York, N. Y.,** has agreed to proceed at once with the signaling of the elevated tracks on the Astoria and Corona lines in Queens. Frank Hedley, president and general manager of the Interborough, has already directed the preparation of the specifications. Mr. Hedley proposed to make experiments with the automatic block signals on the Third Avenue elevated before installing them on the Queens lines. The Transit Commission's engineers pointed out, however, that no such intensity of traffic exists on the Queens lines as on the Third Avenue "L" and that the present system of signaling which is used on the express tracks of the subway and elevated lines would handle the present traffic on the Queens lines. It has been estimated that the signaling installation will cost in the neighborhood of $690,000 for the local tracks on the Astoria and Corona lines.

## *Shops and Buildings*

**Alabama Power Company, Birmingham, Ala.,** is making extensive improvements to its substation at West Huntsville, Ala. The new work involves an expenditure of $10,000.

**Public Service Production Company,** which is a subsidiary of Public Service, Newark, N. J., has nearly completed a new bus garage in Union and Gamewell Streets, Hackensack, N. J. The new structure will have a capacity of 40 buses and is already housing rolling stock of the Newark-Hackensack, Hackensack-Little River Ferry, and Hackensack - Rutherford lines. The garage is built of brick and steel with art stone trim, and it has a frontage of about 204 ft. on Union Street, and 91 ft. on Gamewell Street. Inside clearance is 12 ft. from concrete floor to roof tie rods. Roof construction is of the "amellas" type, consisting of a dome-shaped arch made of wood units so assembled as to give the appearance of an immense inverted fishnet. This type of roof construction does away with all interior columns and roof trusses and has been extensively used in Germany.

**Rockford Public Service Company, Rockford, Ill.,** has announced plans for the construction of a two-story brick and concrete car and bus storage barn over the storage tracks on Kishwaukee Street, adjacent to the present carhouses. Ramps and elevators will lift the buses to the second floor.

## *Trade Notes*

**Howard E. Oberg** has been put in charge of sales engineering in the Middle West by the Billings & Spencer Company, Hartford, Conn. Mr. Oberg's office will be located in Room 5-251, General Motors Building, Detroit, Mich.

**Nichols-Lintern Company, Cleveland, Ohio,** announces that it is now prepared to furnish the N-L bus heater, which has been under development in practical service.

**O. J. Neslage** of the St. Louis office sales staff of the Sullivan Machinery Company, for several years past located in the Joplin, Mo., lead and zinc district, has been appointed local manager at Mexico City, Edificio Oliver No. 3. A. W. Oakes, for several years past manager at Mexico City, has been assigned to a post in the United States. C. W. Miller has been appointed special representative of the Sullivan Machinery Company in Cuba and will cooperate with the company's general agents for Cuba, the Purdy & Henderson Trading Company, Habana 55, asquina a Empedrado, Havana, Cuba. Matt Brodie, manager for Asia of the Sullivan Machinery Company, has sailed from San Francisco for Tokyo, following a three months furlough in this country.

**Trico Fuse Manufacturing Company, Milwaukee, Wis.,** manufacturers of Trico renewable fuses, announces the following staff appointments: B. M. Slicting as sales promotion manager, in charge of the company's main office in Milwaukee; J. E. Eldredge of South Windsor, Conn., sales representative for the state of Connecticut and western part of Massachusetts; Arthur E. Bacon, Denver, Col., sales representative for the states of Colorado, New Mexico, Utah and Wyoming.

**Haskelite Manufacturing Corporation, Chicago, Ill.,** reports that so far this year its products Haskelite and Plymetl are being used in the construction of street cars for the following utilities: Gary Street Railways, Gary Ind.; Municipal Railways, San Francisco, Cal.; Grand Rapids Railway, Grand Rapids, Mich.; West Penn Power Company, Connellsville, Pa.; Cincinnati, Hamilton & Dayton Railway, Dayton, Ohio; Virginia Electric & Power Company, Richmond, Va.; Eastern New York Utilities Corporation, Albany, N. Y.; Cincinnati Street Railway, Cincinnati, Ohio; Union Traction Company, Anderson, Ind., and Eastern Massachusetts Street Railway, Boston.

## *New Advertising Literature*

**International Steel Tie Company, Cleveland, Ohio,** has just issued a handsome calendar for March, April and May, 1927, which has as its decorative feature a colored print of the Rue de Rivoli, Paris.

**Condit Electrical Manufacturing Corporation, Boston, Mass.,** is issuing a descriptive folder of its type D-15C oil circuit breaker. The interrupted capacity of this device is 2,700 amp. at 15,000 volts.

**Mitchell-Rand Manufacturing Company, New York City, N. Y.,** through a circular, announces that it has dissolved its associations with outside mills and is now producing its own line of material under the trademark "Shield Brand." Tapes and webbings are the company's principal products.

**Baker-Raulang Company, Cleveland, Ohio,** is issuing several new booklets describing bus bodies. No. 105 gives complete specifications for bus bodies adapted to the White chassis models 53 and 18 with a 212-in. wheelbase. Bulletin 106 details bodies for the same chassis models 50-B and 54, while bulletin No. 107 illustrates the bodies mounted on White chassis, special attention being paid to their application to models 50-B, 53 and 54.

**A. Gilbert & Sons Brass Foundry Company, St. Louis, Mo.,** manufacturer of armatures, axle bearings, trolley wheels, solder and line material, is sending out a series of sales letters to the mechanical and purchasing departments of the electric railways. Each letter deals with an individual subject, explaining how the Gilbert company came to adopt the standard composition used. The letters are designed to assist the mechanical departments in adopting standards for their roads, whether it be the Gilbert standard or some other.

# Service—*Your Product!*

And in order to successfully merchandise it, your equipment must be kept at the highest point of efficiency, safety and comfort. In the carrying out of this doctrine the most successful electric railways have nearly all their cars equipped with

## "Peacock" Staffless Brakes

*Reg. U. S. Pat. Off.*

These operators know that in the event of an emergency, or during power interruptions, these brakes *will hold!*

Modern car design demands the Peacock Staffless, because of little platform space occupation, simplicity of operation, tremendous braking power, almost unlimited chain winding capacity and light weight.

We will gladly send figures and statements proving what these brakes have done for others and what they will do for you.

**National Brake Company, Inc.**

890 Ellicott Square, Buffalo, N. Y.

*Canadian Representative*

Lyman Tube & Supply Co., Ltd., Montreal, Can.

# AIR SPRINGS float the chassis on cushions of air

## And Thus Road Shock and Vibration are Practically Eliminated

ELIMINATE road shock and vibration and you eliminate the two most destructive factors in the profitable operation of trucks and buses.

From every state in the union, from Canada and from Europe comes proof of this from thousands of truck and bus operators who have standardized on air springs.

From their own experience these operators have found that air springs lower maintenance cost by lessening breakage and repair bills.—

They have found bus patronage is increased because of the supreme riding comfort air springs bring about.—

They have found truck cargoes are protected from damage due to shifting and wrenching.—

They have found air springs lessen driving strain and make it easy to maintain regular schedules regardless of road conditions.

*You can prove this to yourself by trying out one pair of air springs. Shall we send you further details and the name of our nearest distributor?*

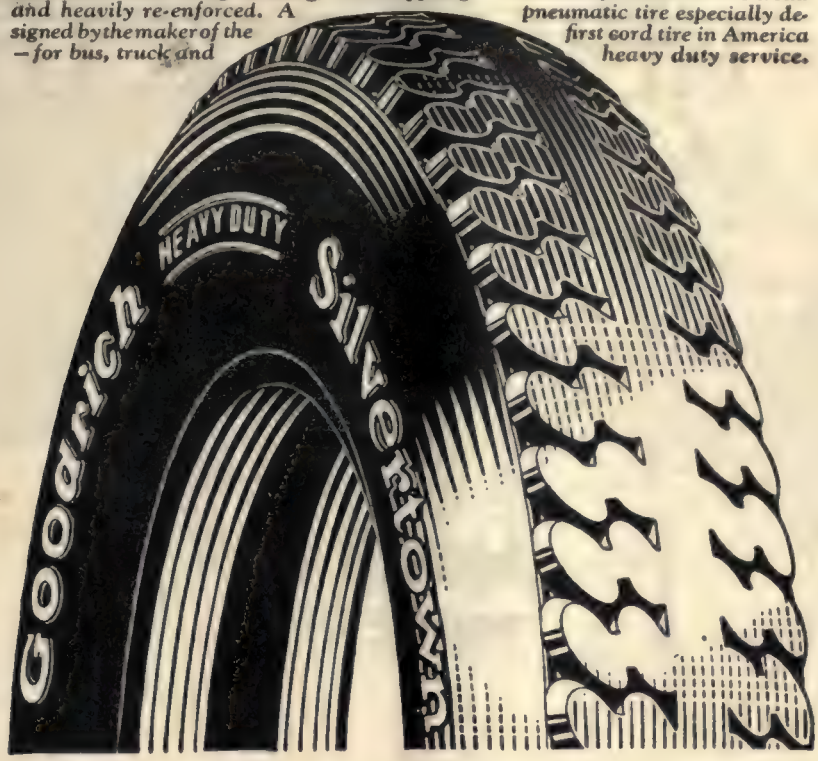
The Cleveland Pneumatic Tool Co.
CLEVELAND, OHIO

**GRÜSS**
Sleeve Type
**AIR SPRING**

**WESTINGHOUSE**
Piston Type
**AIR SPRING**

**THE SHOCK ELIMINATORS FOR TRUCKS-BUSSES-PASSENGER CARS**

*Super dimensions—special rubber compound. Extra tough, heavy duty, anti-skid tread. Long-wearing, "non-rippling." Sidewalls, same stock as tread and heavily re-enforced. A pneumatic tire especially designed by the maker of the first cord tire in America—for bus, truck and heavy duty service.*




# The Open Road to hidden profits!

**There are profits in using Goodrich Silvertown Heavy Duty Cords that may not show on your company's books.**

**Profits increased by savings in maintenance.**

**Profits made by elimination of roadside stops for repairs—because Silvertowns reduce these stops to a minimum.**

**Profits earned by speedier schedules—thanks to soft-cushioned, fast-running Silvertowns.**

**THE B.F. GOODRICH RUBBER COMPANY,** *Established 1870,* **Akron, Ohio**
*In Canada:* **Canadian Goodrich Company, Kitchener, Ontario**

# Goodrich
## HEAVY DUTY
# Silvertowns
## HIGH PRESSURE OR BALLOON

# GAS-ELECTRIC DRIVE

## *After a Hard Winter*

AFTER a hard winter, with its strains and heavy going, bus operators find their Gas-Electrics in much better shape than the mechanical-drive buses. This means lower maintenance and depreciation.

Abuse such as racing, stalling, or jerky applications of power is impossible with Gas-Electric drive.

Gas-Electric equipment is now available in three standard sizes—for light and medium duty in city and interurban service, and double-deck for city operation.

# GENERAL ELECTRIC

390-19

# The rush hour and the interior finish of your cars . . .

THE throng at the street corners . . . waiting—waiting with other shoulders to join the shoulders already rubbing away at the finish of the interior of your cars, with other scuffing feet . . .

Duco is the modern material for all classes of railway equipment. Its flint-like smoothness of surface resists the scuffing and rubbing that so soon mar ordinary types of finishes. Duco endures for years.

An added advantage, and a great one, is the short time required for refinishing when this is finally necessary. When finished with Duco, cars in your paint shop will be marked for Service in half the time it formerly took.

*There is only ONE Duco . . . DU PONT Duco*

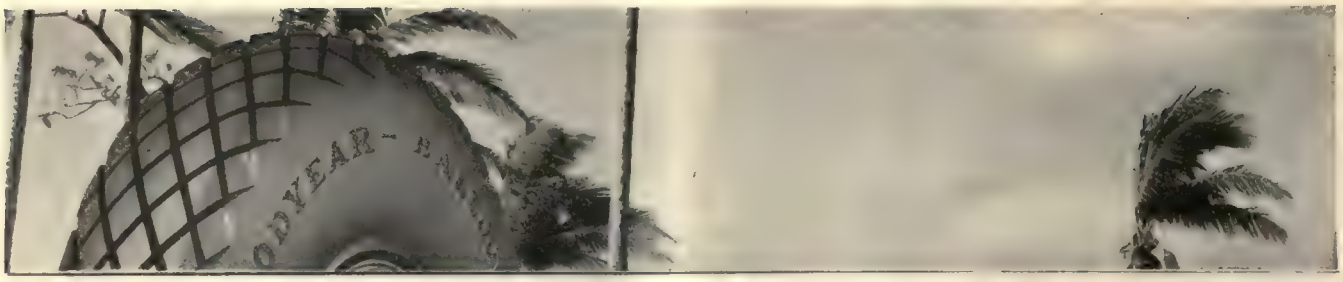
DU PONT DUCO

REG. U. S. PAT. OFF.

PAINTS—VARNISHES—ENAMELS—DUCO

Duco is the correct finishing material for railway equipment. For information write to the E. I. du Pont de Nemours & Co., Inc., Chemical Products Division, Parlin, N. J., 2100 Elston Avenue, Chicago, Ill., 560 Mission Street, San Francisco, Cal.

DU PONT



# What SUPERTWIST Adds to Goodyear Tires

*One of the Goodyear-equipped fleet of buses of the Miami Beach Railway Company, Miami, Florida*

You know what rugged strength and long life have always been built into Goodyear Pneumatic Bus Tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for Goodyear balloon tires, motorbus and heavy duty cord tires.

It far outstretches ordinary cotton cord, and has a maximum flexing power that yields under impact, protecting the tire from rupture, stone bruise and other injuries. It thus insures virtually *double* the *carcass* life of the tire.

Other exclusive features of the Goodyear Pneumatic Tire construction for motorbus service are (1) the new Goodyear band-building method; (2) the new Goodyear breaker; (3) the new Goodyear bead—patent applied for, and (4) the famous All-Weather Tread.

These advantages you get only in Goodyear Pneumatic Bus Tires—the only motorbus tires made of SUPERTWIST.

They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort and long, trouble-free mileage at low cost.

*Goodyear Means Good Wear*

GOODYEAR

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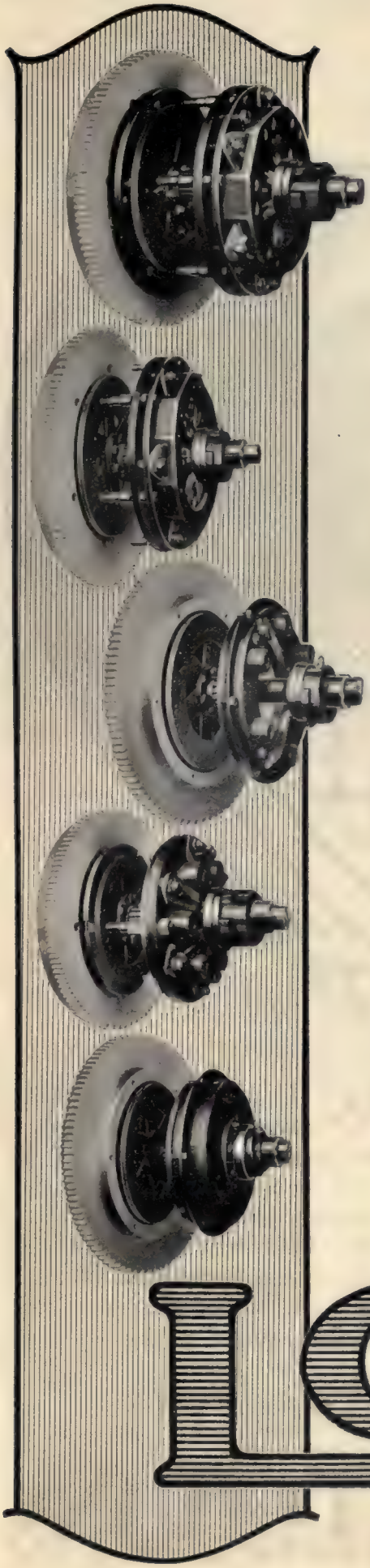


# Keeping Pace with the Industry

After six years' production of automotive clutches, in addition to years of research work, our Clutch Division now offers automobile, bus and truck manufacturers a complete line, (*patented*). The past performance of the Long Clutch merits the investigation of those manufacturers who are seeking *better* clutch performance.

Our Radiator Division is very thoroughly equipped for the design and manufacture of automotive radiators.

LONG MANUFACTURING CO.
DETROIT MICHIGAN

LONG PRODUCTS
Automotive Clutches and Radiators

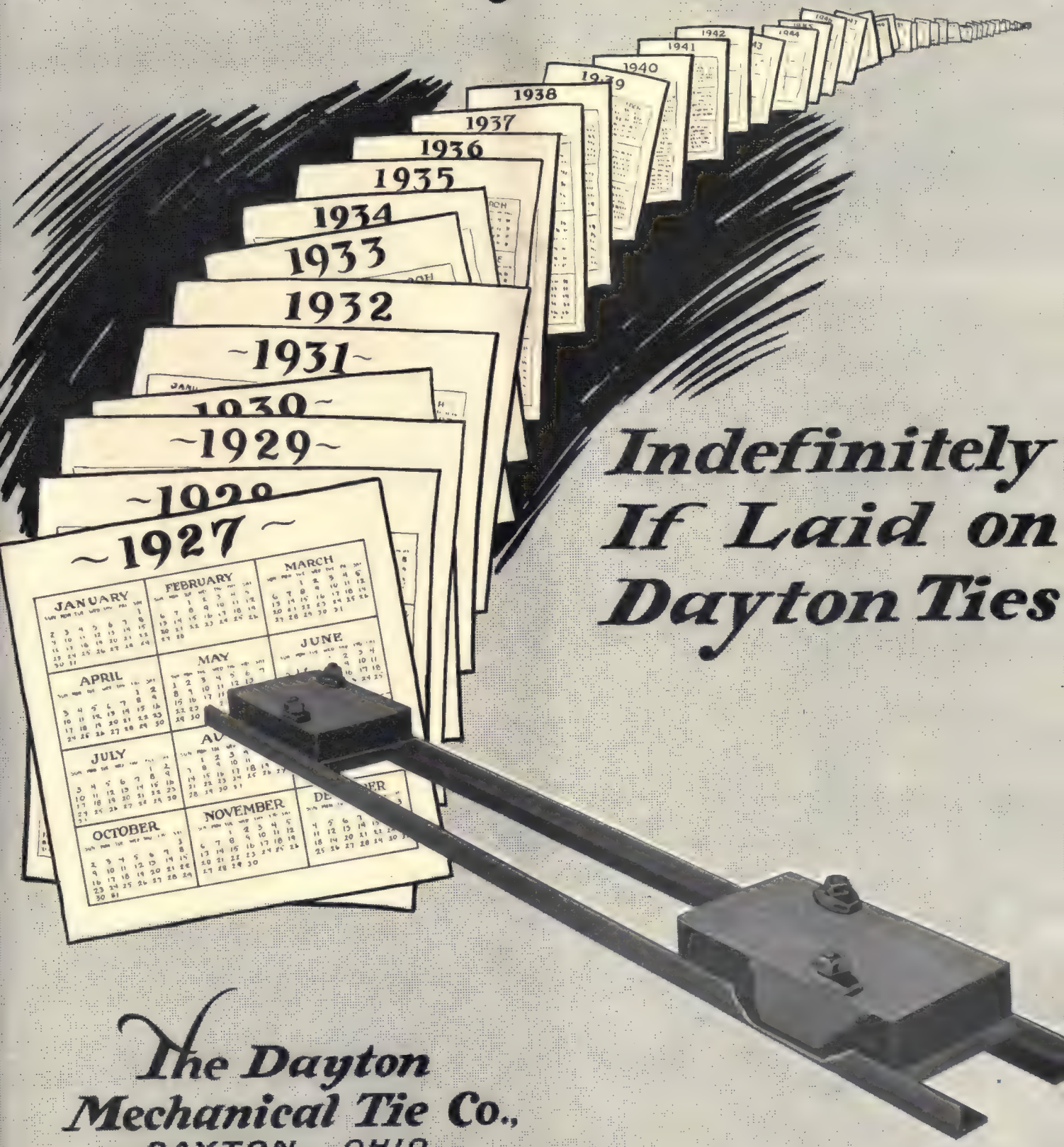
# *Announcing a* KELLY Balloon Tire For Busses

WITH all the stamina, all the easy-riding qualities and all the rugged characteristics of the Kelly passenger car balloon tire, plus the additional strength needed to carry a heavy bus. You will find their use a real economy from the standpoint not only of greater tire mileage, but lowered repair costs to the engine and chassis.

KELLY-SPRINGFIELD TIRE CO.
250 West 57th Street, New York, N. Y.

# KELLY SPRINGFIELD BUS BALLOONS

# How long will Track stay Modern?

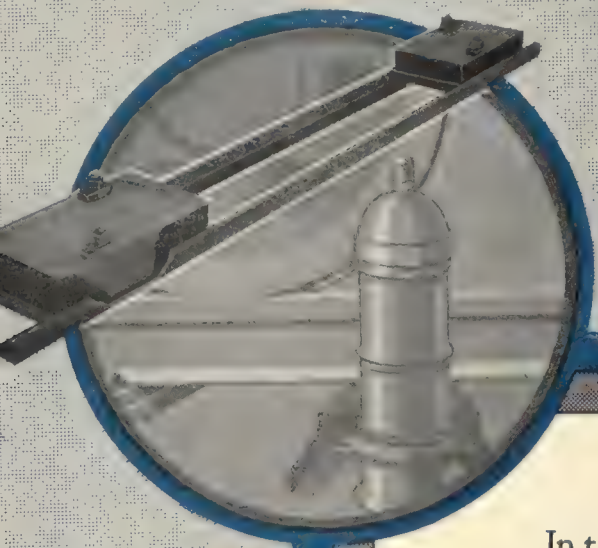



***Indefinitely If Laid on Dayton Ties***

*The Dayton Mechanical Tie Co.,*
DAYTON, OHIO

# Dayton Shock Absorber Track Lasts Indefinitely

*Without a penny of repair expense*



alling Dayton Ties
ishawaka, Ind.

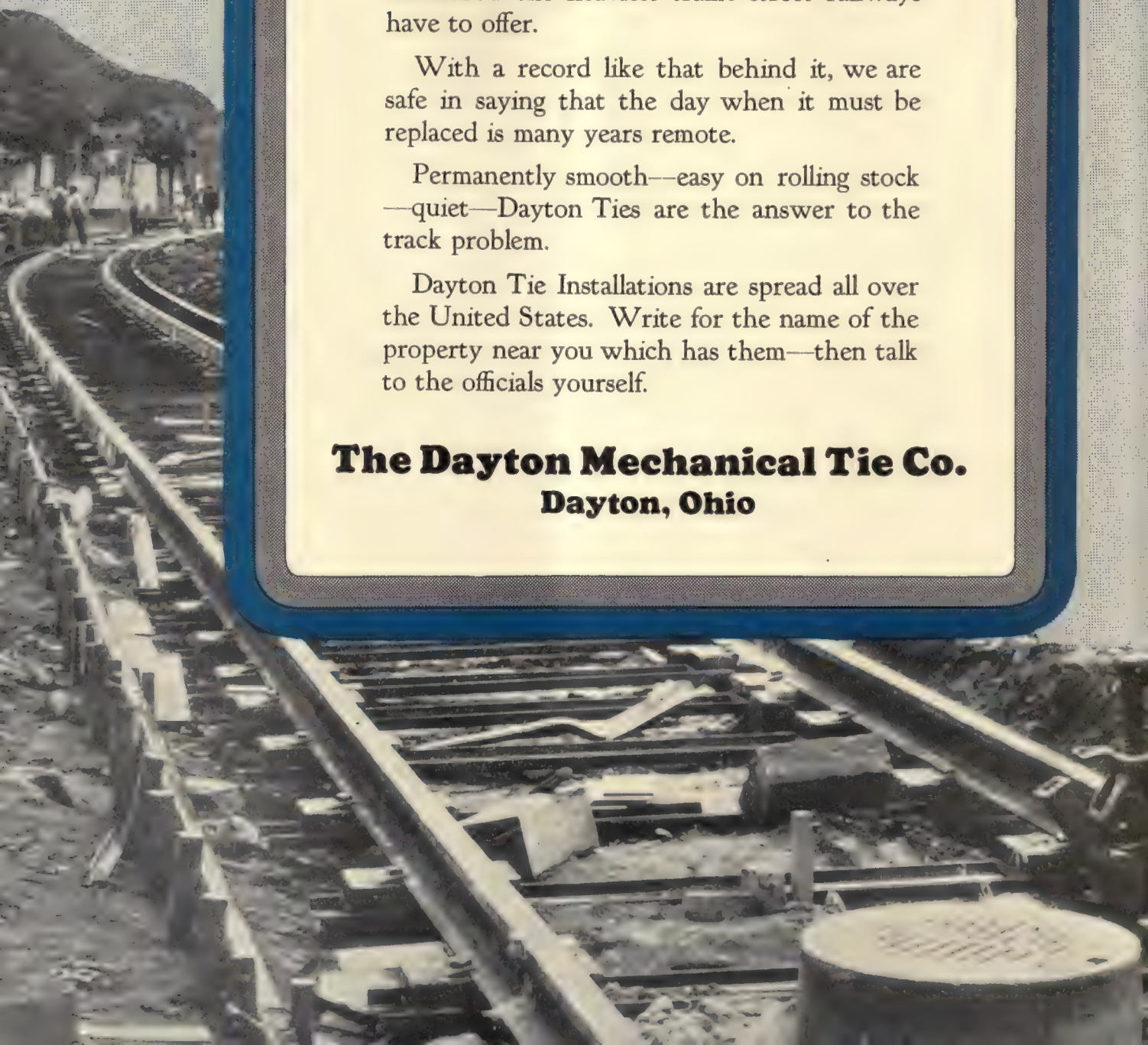
In the 15 years since the inception of Dayton Tie Track, none of it has ever had to be replaced, or cost a penny for maintenance. It has withstood the heaviest traffic street railways have to offer.

With a record like that behind it, we are safe in saying that the day when it must be replaced is many years remote.

Permanently smooth—easy on rolling stock—quiet—Dayton Ties are the answer to the track problem.

Dayton Tie Installations are spread all over the United States. Write for the name of the property near you which has them—then talk to the officials yourself.

**The Dayton Mechanical Tie Co.**
**Dayton, Ohio**



101 YEARS OF MANUFACTURING EXPERIENCE

Cane Webbing may be ordered through any H-W sales office.

No. 327-M

# FOR INTERURBAN NEEDS

THIS Heywood-Wakefield seat is designed for the modern type of interurban service where comfort is now so important. It has been selected for both new cars and for replacement use.

It has deep, double spring cushions shaped to allow more leg freedom. Mechanism rails are set in. The individual backs are properly pitched for comfort.

Our car seating experts will be glad to help you decide on the best seating equipment for your needs. This service is free through any H-W sales office.

*If you have not received a copy of our new Bus Seat Catalogue, write for it.*

Heywood-Wakefield
REG. U.S. PAT. OFF.

Heywood-Wakefield Co., Wakefield, Mass.; 516 West 34th St., New York, N. Y.; 439 Railway Exchange Bldg., Chicago, Ill. H. G. Cook, Hobart Bldg., San Francisco, Cal. The G. F. Cotter Supply Co., Houston, Texas. F. N. Grigg, 630 Louisiana Ave., Washington, D. C. The Railway & Power Engineering Corp., 133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada.

# Parts and Service

**In TULSA** *The Union Transportation Company, operating 16 Graham Brothers Motor Coaches, writes: "Your Company has kept 100 per cent stock of parts available for maintenance".*

**In SANTA MONICA** *The Bay Cities Transit Company says of its fleet of 9 Graham Brothers Motor Coaches: "They are very sturdy, economical and dependable".*

# GRAHAM MOTOR

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

# Always Available

## *For Completeness and Accessibility the Service Facilities for Graham Brothers Motor Coaches are not equalled by any other Motor Coach Organization*

Graham Brothers Motor Coaches are so sturdily built and so well designed that their reputation for dependability is unquestioned. They stand up.

There is double assurance for the operator in the knowledge that service is always available—right there where he bought his motor coach. Every Dodge Brothers Dealer is equipped to give immediate service.

Sales of Graham Brothers 21-passenger street car type coach continue to emphasize the trend towards medium capacity motor coaches.

GRAHAM BROTHERS
EVANSVILLE — DETROIT — STOCKTON
A DIVISION OF DODGE BROTHERS, INC
GRAHAM BROTHERS (CANADA) LIMITED, TORONTO, ONTARIO

**Standard 21-Passenger Street Car Type, complete, $3815**
**12-Passenger Parlor Coach, complete, $3750**
**16-Passenger Parlor Coach, complete, $3995**
*f. o. b. Detroit*

# BROTHERS COACHES

# "Noise and

MR. C. A. SMITH, *Superintendent of Roadways, the Georgia Power Company, with offices in the Glenn Building, Atlanta, Ga. Mr. Smith's study of electric traction problems has brought him nation-wide recognition.*

# track corrugation have been substantially reduced"

"OUR efforts in track construction have been directed toward two important factors," said C. A. Smith, Superintendent of Roadways, of the Georgia Power Company.

"Corrugation is a rather annoying problem here," Mr. Smith continued. "At times in the past we have found it necessary to grind rail that has been in service only one year. Noise, too, has been quite a problem, although we know definitely that our present method of construction has greatly reduced it.

"We use concrete beam construction under ties and rails—wood ties, spaced at about 4-foot centers, 80-lb. ASCE rail, the concrete beams extending 5" below the bottom of the tie. This type of construction including concrete pavement costs approximately seven dollars per foot of track. Our method of track insulation, we have reason to believe, has greatly reduced two of the most annoying problems the electric railway engineer encounters."

*In view of the intensive study Mr. Smith has devoted to track insulation problems, it is significant to note that Carey Elastite System of Track Insulation is being used extensively in the construction of the Georgia Power Company tracks. We shall be glad to tell you more about this efficient material—how easily it is installed and how it cuts vibration and noise to a minimum. Write for full particulars.*

THE PHILIP CAREY COMPANY, *Lockland,* Cincinnati, O.

*View of the Georgia Power Company Street Railway, on Hunter Street, Atlanta, Georgia. Note the interesting construction features, and the Carey Elastite System of Track Insulation in place.*

Carey Elastite

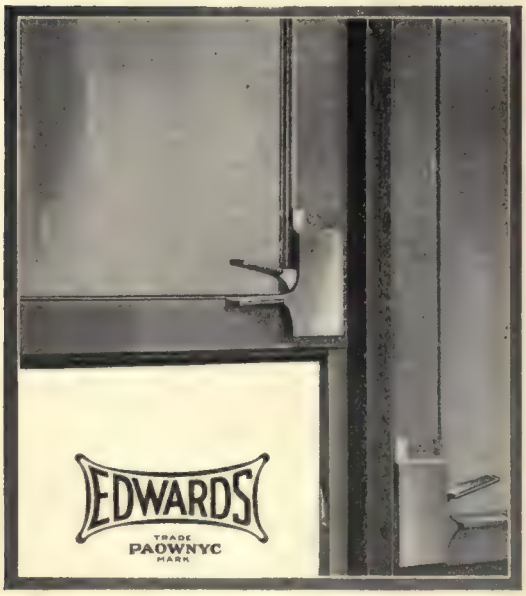
TRADE MARK REGD. U.S. PATENT OFFICE

SYSTEM OF
TRACK INSULATION

# windows DO MAKE A DIFFERENCE in *stimulating* patronage

*Modern car for Chicago & Joliet Electric Railway by Cummings Car & Coach Co. Edwards Metal Sash is used.*

**Air-tight**
**Light in Weight**
**Free from Rattles**
**Easy to Operate**
**Neat and Trim**




SCHEDULES planned for convenient headway and good running time have their place. But the surest stimulant for passenger patronage is the modern car!

The O. M. Edwards Company, pioneers in the refinement of car body details, is keeping pace with this modernization program with Edwards Metal Sash.

Here you have every requirement for passenger comfort, so essential in stimulating patronage—quiet, air-tight windows that are easy to open and close, windows that give a maximum of clear vision.

Specify Edwards Metal Sash on your next order. The several types are illustrated in our Catalog S, sent on request.

## O. M. EDWARDS CO.

New York Syracuse, N. Y. Chicago

Canadian Representatives: Lyman Tube & Supply Co., Ltd., Montreal and Toronto

# Edwards Metal Sash

# The Modern Car
## *is a Business Builder*

WHAT could be more effective in drawing increased patronage to the electric railway than the modern car? Its convenience has never been equalled. Now it is more pleasing in appearance, more comfortable to ride in, and quieter than ever before.

*With all the modern features, the street car is becoming the preferred method of transportation*

CUMMINGS CAR AND COACH COMPANY

*Successors to McGuire-Cummings Mfg. Co.*

111 W. Monroe Street, Chicago, Ill.

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- Brake Pins
- Brake Hangers
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- Center Bearings
- Side Bearings
- Spring Post Bushings
- Spring Posts
- Bolster and Transom Chafing Plates
- Manganese Brake Heads
- Manganese Truck Parts
- Bushings
- Bronze Bearings
- McArthur Turnbuckles

"BOYERIZED" not only means a special steel treatment process and service, but it is also the modern method of protecting car parts against wear and tear. "Boyerized" car parts easily outlast ordinary parts three to four times.

Look over the list of "Boyerized" parts—every one a sure winner in the endurance contest—a considerable reducer of maintenance costs!

Many of the largest electric railways have given their unqualified approval to the "Boyerized" protective method. More are recognizing its merits almost daily.

Don't ask "why"—find out by giving "Boyerized" car parts a thorough test on your own system. We will gladly submit quotations on your requirements. Write for them today.

## Bemis Car Truck Company

*Electric Railway Supplies*

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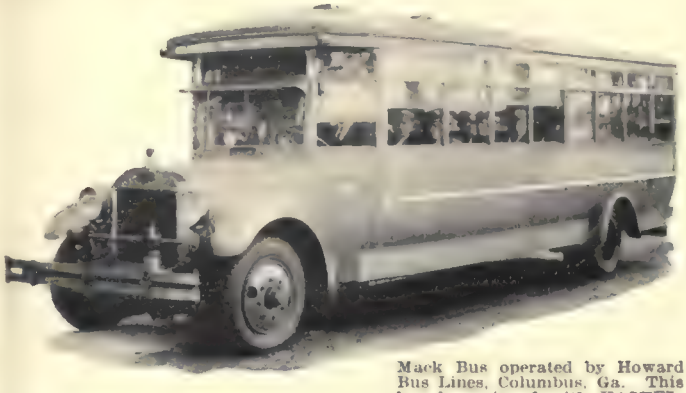
W. F. McKenney, 54 First Street, Portland, Oregon.
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.

# *Can the industry afford* NOT *to have modern equipment?*

A STUDY made by Charles Gordon, Editor of *Electric Railway Journal*, indicates an annual loss to the industry of $181,707,000 through excess or avoidable costs for the operation of obsolete equipment. Can the industry afford *not* to stop such a loss?

HASKELITE-PLYMETL cars and buses are helping many leading operators cut down this waste. The saving in weight through the use of these structural plywood products not uncommonly amounts to 20 lbs. or more per unit of seating capacity. This reduction is effected without weakening the body— in fact, a HASKELITE roof and PLYMETL side panels offer much greater resistance to accidents and withstand the twisting, wrenching and weaving of regular service much longer than either wood or steel construction.



Mack Bus operated by Howard Bus Lines, Columbus, Ga. This bus is equipped with HASKELITE roof.

While decreasing operating costs, these materials help increase revenue by attracting riders. Pleasing body lines and a beautiful finish inside and out are characteristics of the HASKELITE-PLYMETL car which appeal to riders and help meet competition.

Our blue print booklets showing the applications of HASKELITE and PLYMETL to car and bus construction will interest you. Copies will gladly be sent on request.

The Montreal Tramway car shown above was built by the Canadian Car and Foundry Co., Ltd., with PLYMETL side panels.

**Haskelite Manufacturing Corporation**

133 West Washington Street, Chicago

RAILWAY REPRESENTATIVES:

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# HASKELITE·PLYMETL

ERJ4-2Gray

# H-K Seats part of new program put into effect by Northern Ohio Traction Company

The Northern Ohio Traction Company's display at the Cleveland Convention was an excellent example of how refitting and remodeling cars will put them on a modern basis.

Hale-Kilburn Seats Type 900-D played a prominent part. As shown above this is the double chair type with extra soft cushions having deep spring and air individual top pads and concave backs with soft spring pads. The smoking compartment chairs are all leather covered. The main compartment chairs are plush covered and leather trimmed.

Whether you have a remodeling program or a new car program, ask for full particulars of the complete line of H-K Seats.

HALE-KILBURN COMPANY

*General Offices and Works:* 1800 Lehigh Avenue, Philadelphia

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Frank F. Bodler, 903 Monadnock Bldg., San Francisco
Chris Eccles, 320 S. San Pedro St., Los Angeles
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Hale and Kilburn SEATS

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"STANDARD" STEEL PARTS

# Helping to Carry Larger Loads

ELECTRIC cars have clearly demonstrated their efficiency in handling heavy traffic. This traffic is increasing rather than diminishing and "Standard" Steel Wheels, Armature Shafts, Springs and Axles have done much to help sustain the increased load.

## STANDARD STEEL WORKS COMPANY

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WORKS: BURNHAM, PA.

# Cutting the Cost of Trolley Pole Service

THE actual cost of trolley pole service is not confined to the purchase price of the pole itself. What the pole can do from day to day to keep down delays, avoid traffic tie-ups and eliminate frequent repairs or replacement of poles— are factors that determine the ultimate cost of trolley pole service.

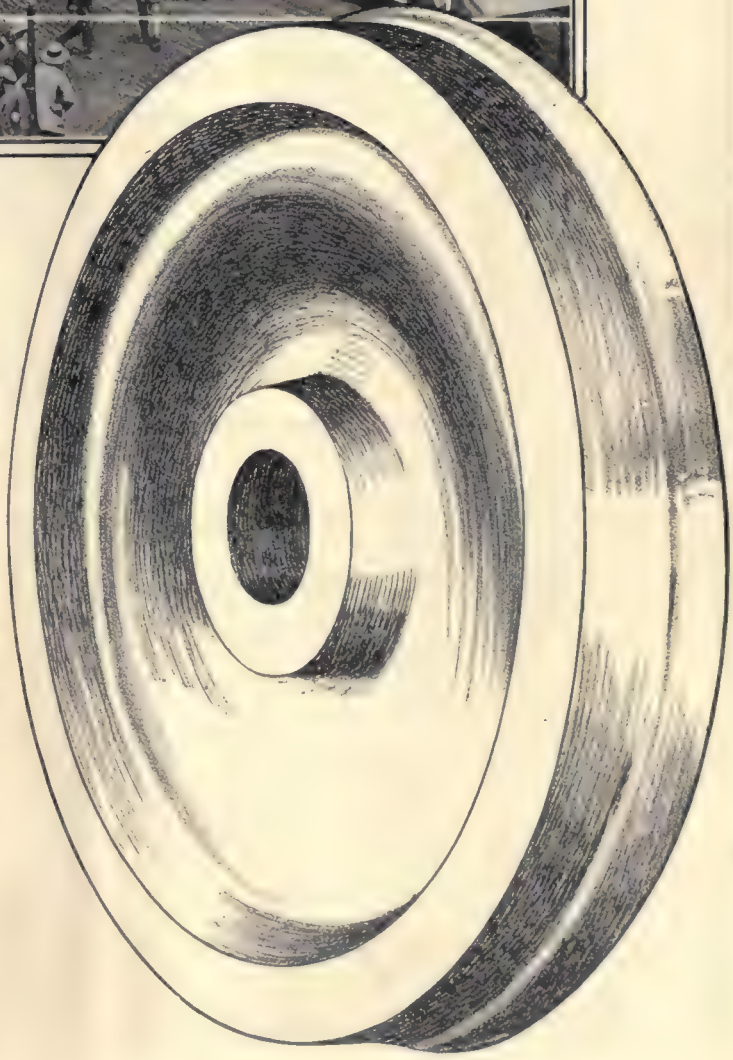
"NATIONAL-SHELBY" Poles are designed with sufficient strength to meet all service requirements and yet not be of excessive weight. A special form of reinforcement at the proper place gives the pole great strength while the grade of steel used and a special heat treatment after drawing gives a high elastic limit and assures long life and satisfactory service. In addition, every "NATIONAL-SHELBY" Trolley Pole is individually tested before it leaves the mill— a form of test that approximates actual service conditions. This type of test is especially important in that it minimizes the possibility of any defective pole being installed — thereby helping to cut the cost of trolley pole service before it begins. A description of this test and complete information about these poles will be sent on request.

NATIONAL TUBE COMPANY

*Frick Building, Pittsburgh, Pa.*

NATIONAL
(SHELBY)

*Clark Street, Chicago, Between Randolph and Washington, 1887.*



# Compare This Scene With That of Today!

The calm, leisurely days of a few decades ago! ... No unbroken procession of automobiles, no thundering motor trucks, no hurrying dashing crowds.

Contrast this scene with that of today: Peak periods, rush hours, stringent schedules; quick starting, sudden stopping, frequent recurrence of emergencies.

Yes, traffic conditions have changed ... and the Gary Wrought Steel Wheel has kept pace with the change.

Our wheel engineers are at your command.

**Illinois Steel Company**

General Offices:
208 South La Salle Street
Chicago, Illinois

# The Time for Summer Oils is here!

So, each year at about this time all oil house men in the Electric Railway industry begin to change over to "summer" oils. The reason for this is that all oils tend to become a little lighter, a little more fluid, in warm weather.

The fluidity of oil is expressed in terms of viscosity—and viscosity varies with temperature.

Now, as it is the *operating* temperature that counts in the application of lubricants to Street Cars, the oils that were used all winter will thin out. They will not feed at the same rate.

So now is the time to begin changing over to:

**TEXACO SUMMER CAR OIL**
**TEXACO SUMMER AIR COMPRESSOR OIL**
**TEXACO SUMMER GEAR LUBRICANT**

The best way is to compensate gradually.

Begin now (as soon as the weather feels warm) adding steadily small quantities of TEXACO *SUMMER* oils and greases to the lubricants now on the cars.* This will gradually raise the viscosity, keeping it normal at all times as summer approaches.

We are ready for you with an ample supply of fresh stocks of summer lubricants, and

*We shall consider it a privilege to have our TEXACO Lubrication Engineers discuss with you in person an interesting and economical method of making this change as worked out on Electric Railways all over the country—or to discuss the significance of:

*"There is a TEXACO Lubricant for Every Purpose."*

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*with*
*maximum*
*mileage*

# Cambria
## *Wheels & Axles*
*for*
## Electric Railway Service

***Other Bethlehem Products for Electric Railways:***

**Axles, bolts, frogs, rails, armature shafts, pole line material, special layouts, switch stands, gear blanks, gage rods, splice bars, switches, crossings, guard rails, tie plates, tie rods, trackwork, and spikes.**

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# Low cost per year and low cost per ton mile

CAR MATERIAL at low cost per year and per ton mile is easily obtainable in strong, durable Douglas Fir. From clear siding to decking; in sills; in every item, this West Coast wood can be supplied ON GRADE in every A. E. R. A. requirement.

A normal Douglas Fir log contains 85% to 90% durable heartwood, and 85% to 90% of the lumber manufactured from it is *all* heartwood. This is the reason for the extra durability of Douglas Fir—why its cost per year is low.

Douglas Fir has light weight in proportion to its strength—a fact of great importance to car builders, but of even more importance to the operating department—for light rolling stock helps to keep down cost per ton mile.

In addition, Douglas Fir has sturdy wear-resistance and unusual stiffness, as well as being an excellent insulation against heat and cold, and almost impervious to water.

Surely a wood which can make a freight car look as spick and span as the one shown above, deserves use in your passenger cars for ceiling, finish, lining and flooring, as well as for framing and hidden parts.

Technical data on electric railway uses of Douglas Fir will be gladly furnished. *Address,* West Coast Lumber Bureau, 5562 T Stuart Bldg., Seattle, Wash.

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*America's Permanent Lumber Supply*

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JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.

Barron G. Collier
INCORPORATED
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**Lowest flange wear and minimum rail abrasion is record for chilled wheels.**

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**A Time Switch for *Real* Service**

When you install Time Switches make sure they are Anderson's; you can then be certain of thorough dependability under the hardest conditions of service.

The entire switch including the high grade timepiece, which is the heart of a Time Switch, is made in our own factory.

Anderson Automatic Time Switches have been on the market for over twenty years—an additional guarantee of their reliability.

Send for the forty-eight page illustrated Bulletin No. 37.

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This register automatically prints tickets as issued—tickets that show every detail of the fare—the date, kind, amount, direction, stations, consecutive number, and the register number. In addition to this—

An exact duplicate of this record including operator's number, is printed and retained inside the register. This duplicate locked-in record is unchangeable and untamperable. It absolutely protects you from the moment the fare is sold until a full and complete accounting is made at the end of the trip. If the slightest discrepancy exists it is at once apparent and responsibility immediately fixed.

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This remarkable ticket-printing and fare protecting register warrants your fullest investigation. See how effectively it stops losses, saves money and increases profits. See how easily, quickly and economically it can be installed on your own transportation lines. This won't obligate you in any way. Write or wire today.

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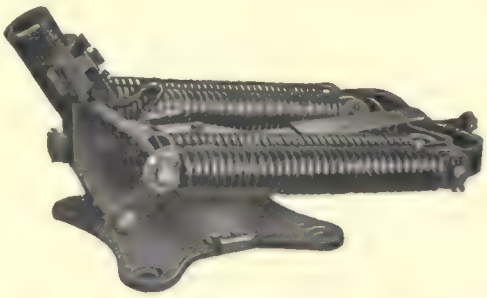

Nuttall US 20-A Timken Roller Bearing Trolley Base

# Grease 'er Twice a Year And Let 'er Go

You have smiled for years at the original feller in Coatesville who tells you to "Hook 'er to the Biler"—that's *amusement*.

But if you want to wear the smile of *genuine satisfaction*, and see that smile on every conductor's face—on every face around the car barn, here's a sure fire prescription:

Put on some Nuttall US 20-A Trolleys. It is literally true that you can lubricate them twice a year and forget them. They swivel on Timken Tapered Roller Bearings, and you know what they are. Every wearing part is hardened, and you can forget wear. Heavy shunts conduct the current around bearings and moving parts, so you can forget arcing troubles. All in all, what could be sweeter?

MEMBER AERA 1927

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**No-wear Check Pawl**
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*Both our latest single and double registers are now equipped for electric as well as mechanical hand or foot operation.*

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A completely satisfactory fare registration system is one that has the confidence of the public, the conductor and the accounting department. The simplicity and accuracy of International Registers maintained for more than thirty years, is combined in the later types with the extra speed and convenience of electric operation.

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**Seat and Curtain Materials**

*There is no substitute for Pantasote*

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**Roofing—Headlining—Wainscoting**

*The only homogeneous panel board*

*standard for electric railway cars and motor buses*

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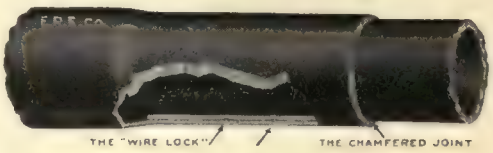


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Westinghouse Air Brake Co.

**Air Receivers and Aftercoolers**
Ingersoll-Rand Co.

**Air Springs**
Cleveland Pneumatic Tool Co.

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Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

**Armature Shop Tools**
Columbia Machine Works
Elec. Service Supplies Co

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American Brown-Boveri Elec. Corp.

**Automatic Return Switch Stands**
Ramapo Ajax Corp.

**Automatic Safety Switch Stands**
Ramapo Ajax Corp.

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Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
Illinois Steel Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse E. & M. Co.

**Axles (Front and Rear) Motor Truck and Passenger Car**
Timken-Detroit Axle Co., The

**Axles, Steel**
Carnegie Steel Co.

**Axles, Trailer & Motor Bus**
Timken-Detroit Axle Co., The

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American Bridge Co.

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General Electric Co.
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Consolidated Car Heating Co.

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Cincinnati Car Co.
Columbia Machine Works
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Railway Track-work Co.

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Cummings Car & Coach Co.
Graham Brothers

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Haskelite Mfg. Corp.

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**Boiler Tubes**
National Tube Co.

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American Steel & Wire Co.
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Elec. Service Supplies Co.
General Electric Co.
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Jeandron, W. J.
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Bemis Car Truck Co.
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Cincinnati Car Co.

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Differential Steel Car Co. Inc.
St. Louis Car Co.

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General Electric Co.
Westinghouse E. & M. Co.

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St. Louis Car Co.

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Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
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Electric Equipment Co.

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General Electric Co.

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American Steel Foundries
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Columbia Machine Works
St. Louis Car Co.
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Columbia Machine Works
St. Louis Car Co.

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Ohio Brass Co.
Wood Co., Chas. N.

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Archbold-Brady Co.

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Pantasote Co., Inc.

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Westinghouse Elec. & M. Co.

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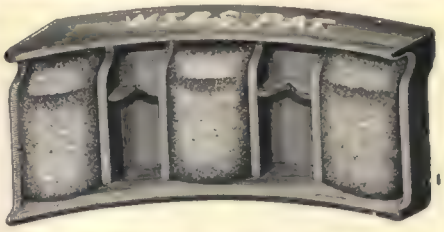

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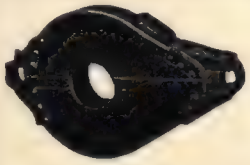

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**Spikes**
Amer. Steel & Wire Co.
Illinois Steel Co.

**Splicing Compounds**
U. S. Rubber Co.
Westinghouse E. & M. Co.

**Splicing Sleeves (See Clamps and Connectors)**

**Springs, Car and Truck**
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works Co.

**Sprinklers, Track and Road**
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

**Steel and Steel Products**
American Steel & Wire Co.
Carnegie Steel Co.
Illinois Steel Co.

**Steps, Car**
Brill Co., The J. G.
Cincinnati Car Co.

**Stokers, Mechanical**
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

**Stop Signals**
Nichols-Lintern Co.

**Storage Batteries (See Batteries, Storage)**

**Strain, Insulators**
A. & J. M. Anderson Mfg. Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

**Strand**
American Steel & Wire Co.
Roebling's Sons Co., J. A.

**Street Cars, Passenger (See Cars, Passenger, Freight, Express, etc.)**
Cummings Car & Coach Co.

**Structural Steel**
American Brown-Boveri Elec. Corp .

**Superheaters**
Babcock & Wilcox Co.

**Sweepers, Snow (See Snow Plows, Sweepers and Brooms)**

**Switch Stands and Fixtures**
Ramapo-Ajax Corp.

**Switches**
American Brown-Boveri Elec. Corp.

**Switches, Selector**
Nichols-Lintern Co.

**Switches and Switchboards**
Consolidated Car Heating Co.
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

**Switches, Tee Rail**
Ramapo Ajax Corp.

**Switches, Track (See Track Special Work)**

**Tampers, Tie**
Ingersoll-Rand Co.
Railway Track-work Co.

**Tapes and Cloths (See Insulating Cloth, Paper and Tape)**

**Tee Rail Special Track Work**
Ramapo Ajax Corp.

**Telephone and Telegraph Wire**
American Steel & Wire Co.

**Telephones and Parts**
Elec. Service Supplies Co.

**Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)**

**Thermostats**
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

**Ticket Choppers and Destroyers**
Elec. Service Supplies Co.

**Tie Plates**
Illinois Steel Co.

**Ties, Mechanical**
Dayton Mechanical Tie Co.

**Ties and Tie Rods, Steel**
American Bridge Co.
Carnegie Steel Co.
Godwin Co., Inc., W. S.
International Steel Tie Co.

**Ties, Wood Cross (See Poles, Ties, Posts, etc.)**

**Tires**
B. F. Goodrich Rubber Co.
Goodyear Tire & Rubber Co.
Kelly-Springfield Tire Co.

**Tongue Switches**
Wm. Wharton, Jr. & Co.

**Tools, Track & Miscellaneous**
Amer. Steel & Wire Co.
Columbia Machine Works
Elec. Service Supplies Co.
Hubbard & Co.
Railway Track-work Co.

**Towers and Transmission Structures**
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse E. & M. Co.

**Track Grinders**
Metal & Thermit Corp.
Railway Track-work Co.
Ramapo Ajax Corp.

**Track, Special Work**
Buda Co., The
Columbia Machine Works
Ramapo Ajax Corp.

**Trackless Trollicars**
Brill Co., The J. G.
St. Louis Car Co.

**Transfer Issuing Machines**
Ohmer Fare Register Co.

**Transfer Tables**
American Bridge Co.

**Transformers**
American Brown-Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co

**Transmission Towers & Structures**
American Bridge Co.

**Treads, Safety Stair Car Steps**
Cincinnati Car Co.

**Tree Wire**
Okonite Callender Cable Co.
Okonite Co.

**Trolley Bases**
General Electric Co.
Nuttall Co., R. D.
Ohio Brass Co.

**Trolley Bases, Retrieving**
General Electric Co.
Nuttall Co., R. D.
Ohio Brass Co.

**Trolley Buses**
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

**Trolley Material, Overhead**
A. & J. M. Anderson Mfg. Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

**Trolley Wheels (See Wheels, Trolley)**

**Trolley Wheel Bushings**
Star Brass Works

**Trolley Wire**
American Brass Co.
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Roebling's Sons Co., J. A.

**Trucks, Car**
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
St. Louis Car Co.

**Truss Planks**
Haskelite Mfg. Corp.

**Tubing, Steel**
National Tube Co.

**Tubing, Yellow & Black Flexible Varnishes**
Irvington Varnish & Ins. Co.

**Turbines, Steam**
American Brown-Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

**Turnstiles**
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.

**Turntables**
American Bridge Co.
Elec. Service Supplies Co.

**Valves**
Ohio Brass Co.
Westinghouse Tr. Br. Co.

**Varnished Papers & Silks**
Irvington Varnish & Ins. Co.

**Varnishes (See Paints, etc)**

**Ventilators**
National Ry. Appliance Co.

**Ventilators, Car**
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

**Vestibule Linings**
Haskelite Mfg. Corp.

**Welded Rail Joints**
Lorain Steel Co.
Metal & Thermit Corp.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

**Welders, Portable Electric**
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

**Welders, Rail Joint**
Ohio Brass Co.
Railway Track-work Co.

**Welding Processes and Apparatus**
General Electric Co.
Metal & Thermit Corp.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

**Welding Steel**
Railway Track-work Co.
Una Welding & Bonding Co

**Welding Wire**
American Steel & Wire Co.
General Electric Co.
Railway Track-work Co.
Roebling's Sons Co., J. A.

**Welding Wire and Rods**
Railway Track-work Co.

**Wheels, Car, Steel & Steel Tired**
American Steel Foundries
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Bemis Car Truck Co.
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**Wheel Guards (See Fenders and Wheel Guards)**

**Wheel Grinders**
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**Wheel Presses (See Machine Tools)**

**Wheels, Trolley**
Columbia Machine Works
Elec. Ry. Equipment Co.
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Star Brass Works

**Wheels, Wrought Steel**
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Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
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New Brill Modern Cars

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Brill No. 177-E Trucks
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Brill "Renitent" Post Casings
Brill Vertical Handle Brakes
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now operated by

The Potomac Edison Co.
Cumberland, Md.

Realizing that the type of rolling stock operated is an important factor in their future success hundreds of electric railways have already displaced heavy and comparatively obsolete cars with new light-weight equipment, the type which not only saves but earns by attracting increased revenue passengers.

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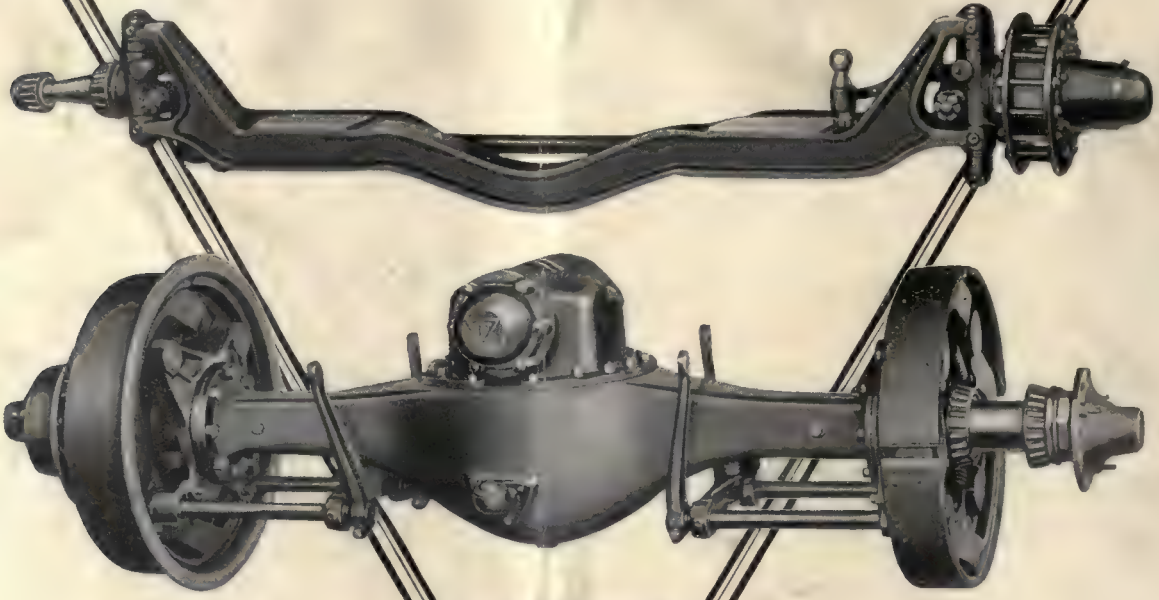
PHILADELPHIA, PA.
AMERICAN CAR CO. ST LOUIS MO — G.C. KUHLMAN CAR CO. CLEVELAND OHIO. — WASON MANF'G CO SPRINGFIELD MASS



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# ELECTRIC RAILWAY JOURNAL

Experience, craftsmanship, facilities, - - - - these are the things which make the difference between a metallurgist's formula and the dependable, uniform, trade-marked product which is Phono-Electric Trolley Wire.

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"Bridgeport" BRASS CO. TRADE MARK

Phono-Electric

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In progressive Houston, where 17 railroads meet the sea, Westinghouse modern railway equipment predominates.

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## *Let the* JOURNAL *Do It*

TIMELY facts about the use of loading platforms alongside street railway tracks in many cities are given in a comprehensive survey article appearing in this issue of the JOURNAL. Detailed information has been secured from all the larger cities in this country. At present, engineers of a number of important railway systems are confronted with problems concerning the installation of loading platforms. Letters we have received indicate that the results of this survey are being awaited with lively interest.

Making an investigation of this sort, which would be a large undertaking for any single individual engrossed in his own daily problems, is one way in which ELECTRIC RAILWAY JOURNAL serves the industry.

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SAVING THE RAIL SAVES THE RAILWAY

*333 amp. at 500 v.*

*209 amp. at 300 v.*

*150 lbs.*

# "AJAX"

## ELECTRIC ARC WELDER

Do you realize that the Ajax is in a class by itself judged by combination of high capacity and low weight? Judged by any other standards, "Ajax" also maintains its lead. Its simple wiring scheme with all circuits in sight, the accessibility of all parts, the ample ventilation, the trolley pole making contact on the bright underside of the wire—these are some of the other features which make "Ajax" first choice on so many roads. Finally—price—lower than you'd expect if you didn't know.

*Why not get a quotation?*

**Railway Trackwork Co.**

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12660

SAVING THE RAIL SAVES THE RAILWAY

# Famous for Service-the Big 4

## Marathon Trolley Ears

SHEER MERIT, demonstrated by unrivaled records of service—in some instances 420,000 car passes and over—has made O-B Marathon Trolley Ears the choice of Line Superintendents on every property where used.

Besides giving from two to three times the service formerly expected of trolley ears, O-B Marathons eliminate wire wear under the ears and materially reduce the number of line breaks. Every Marathon on the line means money saved.

## Type N Lock Hanger

THOUSANDS of O-B Type "N" Lock Hangers in service on many properties have demonstrated the dollars and cents value of its special steel spring washer construction. A permanently tight joint between hanger and ear is made by simply screwing the ear onto the hanger stud. No backing off of the ear is necessary to secure alignment with the trolley wire. This eliminates trouble and rapid depreciation—insures greatly increased service.

## BC Frog

CLOSE to half a million car passes is the average reported by five properties using O-B Type "BC" Trolley Frogs. Many individual "BC" Frogs gave even longer service: one lasted for 652,500 car passes before it was replaced.

The big reason for long life is the close coupled center construction, which permits the trolley wheel to ride on its groove from end to end. There is no wear on the pan. This frog can be placed farther out of the curve, reducing wire wear.

## C Splicer

THE PREFERENCE shown by scores of Line Superintendents for the Type "C" Splicer has made it the largest seller in the O-B line of Splicers. Repeat orders have come from every property on which it has been used.

Its narrow cross section, low center of gravity, strength and durability of the metal, combine in giving a permanently straight, smooth underrun. All of which means long, trouble-free service. Wire enters in a straight line. Easily installed.

**Ohio Brass Company, Mansfield, Ohio**
Dominion Insulator & Mfg Co., Limiled
Niagara Falls, Canada
220B

# Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

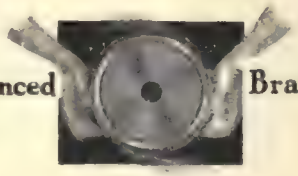
# Would you try to row a boat with one oar?

It can be done, but the inefficiency of steering against the turning effect of the one-sided force is obvious.

Similarly, balanced braking (the double shoe clasp type) is vastly superior to the single brake shoe rigging. The heavy braking load is equally balanced on opposite sides of the wheel. There is no shifting of the journal box bearing; no unbalanced load on truck frames and truck springs; less brake shoe wear; less journal box wear; fewer hot boxes; fewer slid-flat wheels; smoother and shorter stops; less train resistance in starting.

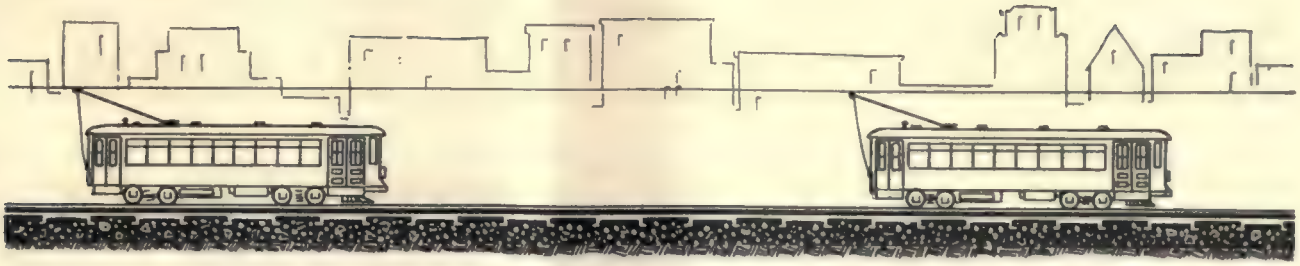
In other words, dozens of advantages—all making for economy and better transportation service.

AMERICAN MULTIPLE-UNIT
CLASP BRAKES



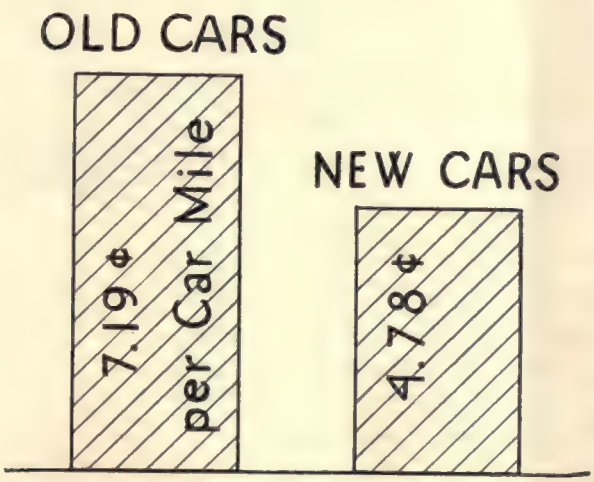

**AMERICAN STEEL FOUNDRIES**

NEW YORK CHICAGO ST. LOUIS



# *New Cars will Coast Farther and Last Longer on Renewable Track*

Power Costs on Cars




Net savings 2.41c.

A LARGE factor in the power savings possible with new cars is new track. Our users say their new cars coast farther on Twin Tie Renewable Track than on other construction. Leakage and stray currents are minimized, and moreover, your riders and other users of the streets know that this is best in city transportation. With Twin Ties the initial cost of new track is reduced—Ask for delivered prices on Twin Ties and use the man-hour detailed estimate sheet with the quotation to check what 200 electric railways know. Twin Tie Construction will help save power, but best of all, it saves in construction costs.

THE INTERNATIONAL STEEL TIE COMPANY
*Cleveland, Ohio*

Renewable Track? Rail Tilting? Rigidity? Flexibility? Noise? Old Concrete Base? Costs? Bearing? Construction Methods?

*Look it up in your "Paved Track Note Book"*

**Steel Twin Tie Track**

# Modern Problems and the Safety Car

SAFETY Car Control Devices were designed to eliminate many of the problems confronting modern traction progress.

By ingeniously interlocking the power, brake, and door controls, Safety Car Devices provide for modern safety and efficiency in operation. This centralized control makes for ease of handling and the possibility for one man operation.

The foremost traction companies of the world have recognized the unlimited advantages of Safety Car control, and are specifying it as standard equipment on their modern, new cars—many, too, are by its adoption, rejuvenating old equipment.

***We make the equipment which makes the Safety Car.***

*One of the most recent installations of Safety Car equipment has been in Wheeling, West Virginia, where the Wheeling Public Service Company has placed in operation fifteen cars by Brill, all of which are Safety Cars.*

**SAFETY CAR DEVICES CO.**
**OF ST. LOUIS, MO.**

*Postal and Telegraphic Address:*
**WILMERDING, PA.**

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

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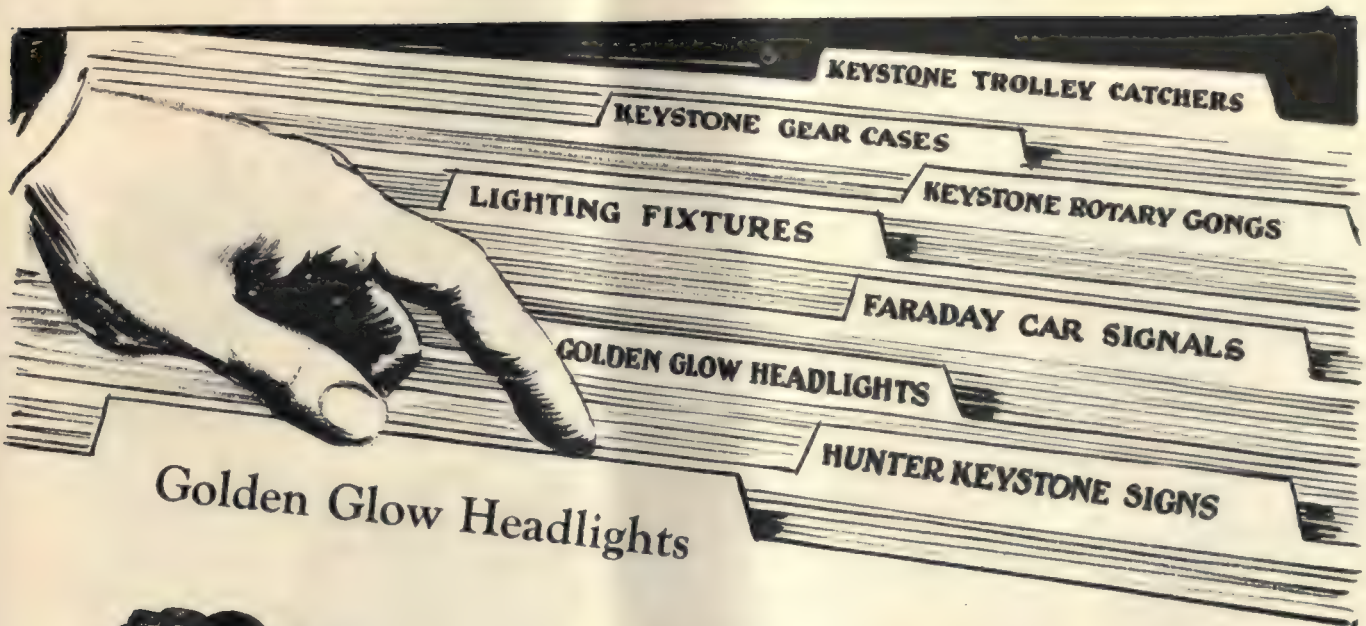


# Golden Glow Headlights

To increase patronage, add attractiveness and efficiency to your cars by selecting your equipment from the broad line of Keystone Car Specialties.

## Golden Glow Headlights

Though projecting powerful and well concentrated beams of light, the greenish-yellow glass reflector eliminates a great portion of dazzling effect by absorbing the violet and blue rays. This glass reflector will not scratch, tarnish or corrode. Golden Glow Headlights are made in various styles and sizes to suit every requirement. Provide this safety for your passengers and your equipment.

*Get Catalog No. 7 for full particulars of Keystone Equipment.*

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1123 Bessemer Building

BOSTON
88 Broad Street

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

# Where Specifications Agree

For three years the Department of Street Railways of the City of Detroit has been making experiments and service tests to determine the proper type of double deck coach equipment for its requirements. Westinghouse Air Brakes were included on all test coaches, and following this actual operating experience, were included in purchase specifications for new equipment.

**Fleet Operators** everywhere have quickly recognized the value of air brake control and purchase specifications now read—"Air Brakes—by Westinghouse."

**Progressive Coach Builders**—whose engineers, in addition to forecasting future design trends, must consider the utility of every element in its relation to the reliability and economy of the complete unit, and whose sales executives must provide a vehicle to meet operator demand, with distinctive sales features—have responded by adopting Westinghouse Air Brakes as standard factory equipment.

Builders and Buyers specifications now agree—Air Brakes—by Westinghouse.

WESTINGHOUSE TRACTION BRAKE CO.
**Automotive Division, Wilmerding, Pa.**

WESTINGHOUSE
AUTOMOTIVE AIR BRAKES

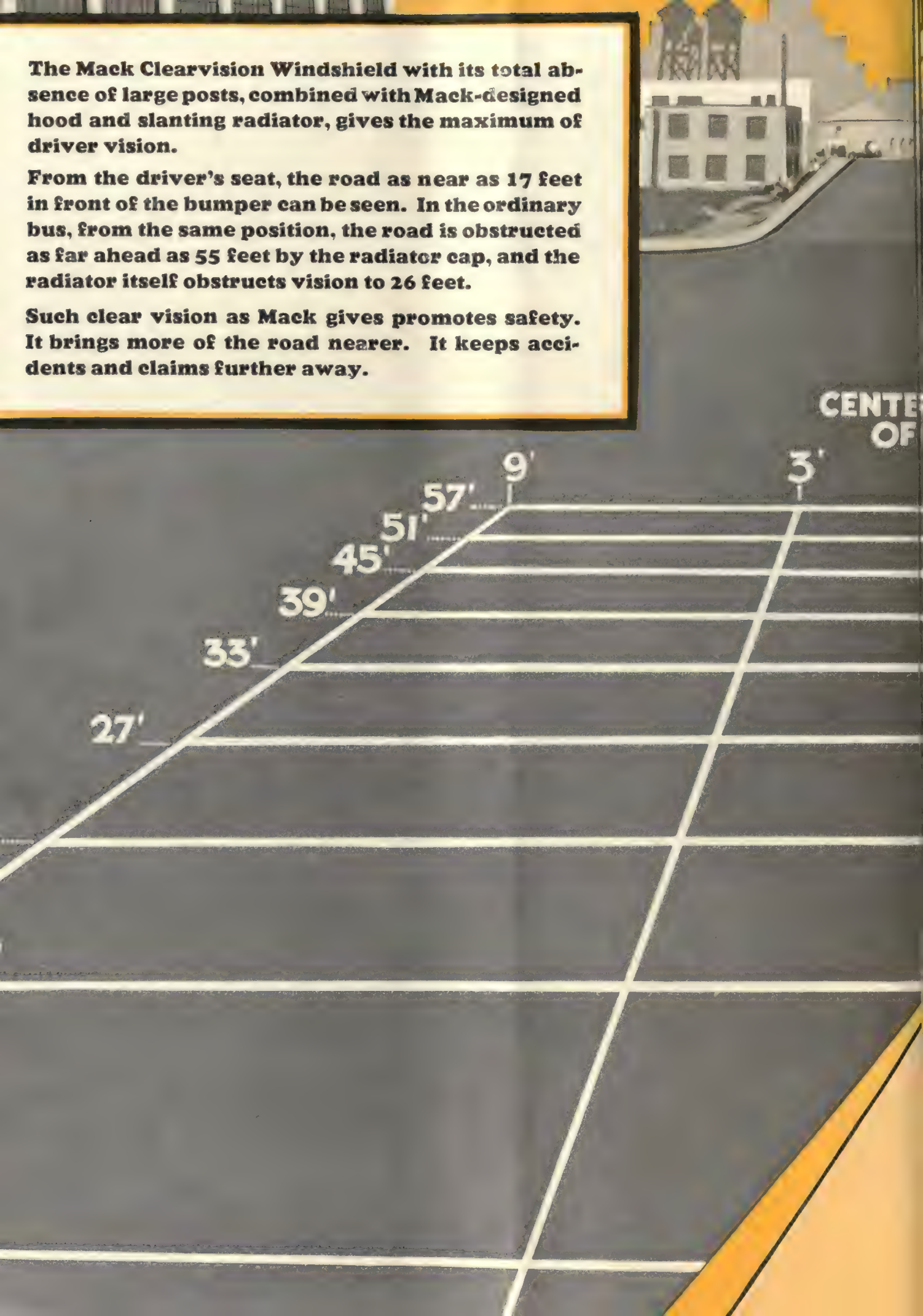
# Clearvision

To see the maximum road bed—to get an unobstructed view—This is CLEARVISION—an exclusive Mack feature which promotes safety, reduces accidents, keeps down claims—

The Mack Clearvision Windshield with its total absence of large posts, combined with Mack-designed hood and slanting radiator, gives the maximum of driver vision.

From the driver's seat, the road as near as 17 feet in front of the bumper can be seen. In the ordinary bus, from the same position, the road is obstructed as far ahead as 55 feet by the radiator cap, and the radiator itself obstructs vision to 26 feet.

Such clear vision as Mack gives promotes safety. It brings more of the road nearer. It keeps accidents and claims further away.



3'
9'

For Their Latest Route The Portland Electric Company
Have Chosen Six Cylinder City Types

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**Twenty-seven years of manufacturing one product for one purpose—highway transportation.**

**Such a record must have influenced the Portland Electric Company when they considered placing their last order for Macks. They realized that their reputation depends on the kind of service they render and that their service can be no better than their equipment. And they chose Macks.**

**The Clearvision Windshield, the Mack hood and the Mack sloping radiator will give their drivers a decided advantage in handling their bus—maneuvering, pulling up closely to the road, avoiding road depressions.**

**They chose Macks—reputable, reliable, equipment.**

## Mack Trucks, Inc.

**International Motor Company**

**25 Broadway, New York City**

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"OBTAIN the friendly cooperation of the public. . . . Adopt modern methods and equipment," says the Advisory Council of the A. E. R. A.

By removing the annoyances and dangers of manually operated doors on street cars, by eliminating friction and congestion in the aisles and at the entrances and exits, by reducing standing time and increasing schedule speed, N. P. Door and Step Equipment has done much to win "the friendly cooperation of the public."

## NATIONAL PNEUMATIC COMPANY

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MANUFACTURED IN TORONTO, CANADA, BY
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## Licked by BRAKEBLOKS

HEAT kills brakes. Heat burns out binders of fabric linings. Heat chars and glazes linings, and makes them slip. Heat passed from oversized drums to nearby tires causes blowouts. Heat is the thing to blame for accidents, for relining expense, for delays, for danger.

You can't dodge heat. When you stop 16,000 pounds going down a hill you generate just so much heat, no matter how you stop the moving mass.

You can't dodge heat—but you can lick it—you can prevent it from making trouble—you can use a braking material that heat doesn't bother, and a material that will get rid of heat fast.

That's the way the American Brake Materials Corporation answered the whole question of automotive braking—by inventing Brakebloks, a new material that has the hardness of 35 carbon steel—that has no metallic content—that won't burn out—that has a life so long that ordinary braking material is outlasted three and four times.

Now—brake linings of the new material are made in separate segments for the quick dissipation of heat. Drums are smaller—tire clearance is greater—blowouts from heat are overcome.

For the savings that result from less relining—fewer blowouts—for the certain stoppage of trucks, busses, taxicabs and pleasure cars, write for booklet "The Last Battle of the Momentum—Brake War", or send us your specifications for recommendations.

AMERICAN BRAKE MATERIALS CORPORATION
Dept. J-1 DETROIT

Brakebloks are individual brake shoes fastened to the brakeheads or brake bands, allowing room for heat dissipation.

1 They mean constant, sure braking control.
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3 They do not deteriorate or become less efficient under great heat.
4 They do not swell or shrink; they are always the same.
5 They do not squeal.
6 They do not cut drums.
7 They save money in material, in labor, in relining time saved.
8 They outwear all other friction materials.
9 They are applicable to all automotive vehicles and industrial machinery.
10 They are made by the company with the longest braking experience.

AMERICAN BRAKEBLOKS

RAILROAD BRAKING PRACTICE APPLIED TO MOTOR CARS AND MACHINERY

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# Light Weight

*or*

# *Under Weight*

?

Cincinnati, as a pioneer in the movement toward lighter weight in electric railway cars, has worked consistently to establish a *practical* standard of lightweight construction.

The BALANCED Lightweight Car as Cincinnati builds it today is the result of this effort. Its lightness is born of modern engineering in every detail of construction,— the use of lightweight steels and aluminum castings; the accurate co-ordination of each unit in its relation to the whole.

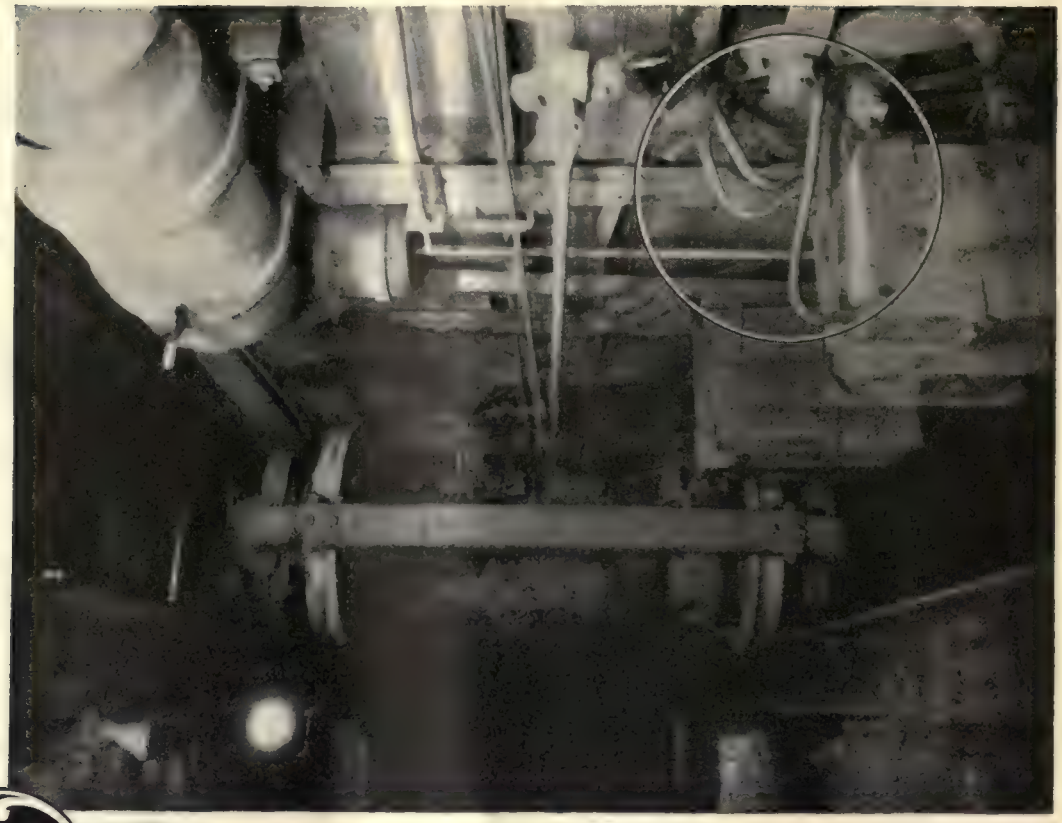
You will find no signs of *under*-weight here, no suspicion of the "shaving down" process. One well known user of Cincinnati Lightweight NEW Cars wrote us recently that "they stand up just as well as the heavier cars." We believe they will stand up very much better, because weight for weight the component parts of Cincinnati NEW Cars are very much stronger.

Blue-prints and full details will be furnished gladly to interested electric railway executives.

CINCINNATI CAR COMPANY
Cincinnati, Ohio

CINCINNATI *New* CARS

*A step ahead of the modern trend*



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## stands up under dampness and hard knocks

When you want to be sure about cables exposed to moisture and abrasion, use G-E Paragon Tape. It is unexcelled as a binder and as a protecting weather-proof covering.

It is one of the many high-quality G-E Insulating Materials—the result of research—which help to flatten the maintenance cost curve.

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All G-E Insulating Materials are sold through one prompt-to-serve source—the G-E Merchandise Distributor. His stocks are complete. He can supply you from his warehouse. Deliveries are speedy.

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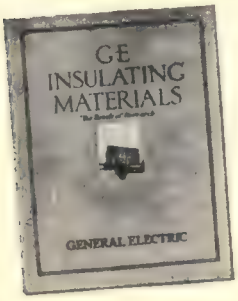


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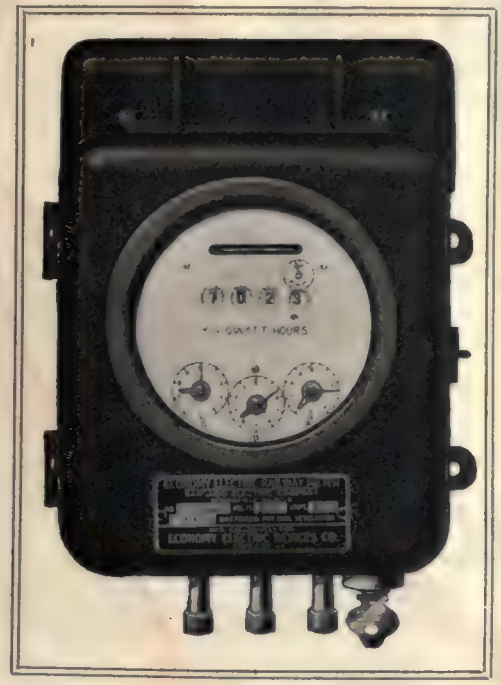
800-8

GENERAL ELECTRIC

MERCHANDISE DEPARTMENT, BRIDGEPORT, CONNECTICUT

# Eastern Massachusetts Street Railway Co.



## *orders*

# ECONOMY Meters

*with* Inspection Dials
*for* 50 New Deluxe
Cars

THIS progressive property was completely equipped with meters in 1918. In 1922 it standardized on the Inspection Dial, and since that time every new car purchased has been equipped with an Inspection Dial ECONOMY Meter.

THIS device actually tells the motorman and the management whether power has been saved or wasted, and how much.

That, in brief, is the underlying reason for the success of the ECONOMY Meter.

The ECONOMY "Power-saving" and Car Inspection Meter provides a method that accurately and automatically shows when car inspection is needed. It also shows at a glance how much more work a car can do before inspection is needed, or, in case of a road failure, how much work the car has done previous to the failure. All this without any clerical labor.

The ECONOMY Meter is a rugged device which requires remarkably little maintenance. It is a standardized product, easy to maintain on a railroad at a cost averaging less than $2.00 per year, per meter.

More than two hundred street and interurban railways are equipped. Whether you generate or purchase power, the savings effected through the use of ECONOMY Meters are real savings for the Transportation, Electrical and Mechanical departments.

* * *

INSTALL ECONOMY Meters now. You can have two years to pay. Meanwhile the meters will earn over twice their cost. May we tell you more?

ECONOMY ELECTRIC DEVICES COMPANY
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Sangamo Economy Meters
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# Why pay a staggering premium *for track maintenance*?

# Modern new equipment turns the loss to dividends

Every road that has even partially replaced obsolete cars with new equipment tells the same story—that light weight modern cars, fully capable of handling traffic peaks, result in track and equipment maintenance savings of from 5 to 54%. The average on 20 representative roads is over 27%.

And this item of maintenance is but one of many savings resulting from an adequate modernization program. St. Louis Quality Cars will help your property achieve them. It will be our pleasure to prove it.

ST. LOUIS CAR COMPANY
St. Louis, Mo.

*built by*

**St. Louis Car Co.**

Quality Cars

# Looking into controller maintenance in New Orleans

A year's thorough trial demonstrated to the New Orleans Public Service, Inc. that the G-E Line Breaker equipment with the improved LB Controller Handle

—greatly reduced burning in the controller (no more stubbing fingers)
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—materially reduced time for making repairs
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The tests were made on three different cars, covering a total of 79,000 miles. The controller maintenance of these cars was one-fourth that of three others in similar service but not so equipped.

As a result, 342 K-36 controllers are being equipped with LB control devices.

*For*
Modern Equipment Standards

330-33

GENERAL ELECTRIC

# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

*Volume* 69 New York, Saturday, April 9, 1927 *Number* 15

## Exhibits to Open on Saturday at This Year's Cleveland Convention

WITH the approval of the executive committee an important departure from the practice followed at former annual conventions has been inaugurated by this year's exhibit committee of the American Electric Railway Association. Exhibits will be set up, manned and opened for inspection at noon on Saturday, Oct. 1. Delegates who arrive early will have an oppportunity to inspect exhibits Saturday afternoon and Sunday, before the opening of the convention on Monday. This is in addition to Wednesday of convention week, which, as in former years, has been set aside for visiting exhibits.

An important forward step has been taken. As the convention has grown rapidly in size it has become increasingly difficult for railway men in attendance to view the exhibits thoroughly without neglecting the business sessions. When the practice was started several years ago of setting aside one full day to inspect the exhibits a considerable improvement was made. The new plan of opening them on Saturday is another move in the right direction.

Time spent among the exhibits at the convention is time well invested. Many thousands of dollars are expended each year by manufacturers to bring their equipment to the convention for inspection by operating men. The cost to operating companies for sending executives and employees to the convention is likewise heavy. Unless adequate time is available for thorough examination of manufacturers' products and for attendance at the convention sessions, full value is not derived by the industry from these expenditures.

Of course, the new arrangement will not be productive of improved results unless operating men take advantage of it by getting to Cleveland on Saturday or Sunday. Only through the co-operation of railway executives can this be assured. Get your men to Cleveland early! See to it that they go over the exhibits thoroughly! The time and effort put in will be more than amply repaid in new ideas and new enthusiasm.

## A Big Step in Weight Reduction

ENTIRELY new possibilities in car design are opened up by the success which has so far marked the operation of the experimental aluminum car built by the Cleveland Railway and exhibited at the convention last fall. By the use of aluminum alloys as presented in an article elsewhere in this issue, the weight of a large city car more than 51 ft. long and equipped with four motors has been reduced to only slightly more than 30,000 lb. That is indeed light weight with a vengeance! The car was built entirely as an experiment. But after more than four months operation under the severe conditions encountered in Cleveland, it has developed no structural weaknesses.

Before attempting to draw conclusions from the Cleveland experiment it should be understood that this car was designed for steel and not for aluminum construction. When the railway decided to build an aluminum car for exhibit at the convention, time did not permit much more than merely the substitution of aluminum for steel, part for part. It seems reasonable to assume, therefore, that a car designed originally for aluminum would permit more scientific utilization of the light-weight material.

Cleveland has without doubt pioneered a most important experiment. There seems ample reason to look forward to a more general use of aluminum for car construction in the near future. If this becomes practicable, an attractive reduction in operating costs would result from the very large saving in weight that can be made.

## Facts in Annual Reports Are Encouraging

OPTIMISM does not exude from the pages of the annual reports of the electric railways for 1926 so far received for digest by the JOURNAL, but it is not difficult to find very encouraging signs in them. Everything considered, the best all-around showing, perhaps, is contained in the statement of the Chicago Surface Lines. That property carried not only the largest number of passengers in its history but made its best financial showing in any year except one. This may be attributed to the determination of the management to carry on just as it had in the past, no matter what the outcome of the franchise negotiations.

One thing that stands out as most heartening is the tendency shown in practically all of the reports toward no lessening in the number of passengers carried. This is true, as before mentioned, of Chicago, and is true in lesser degree in the case of the companies in Cincinnati, Milwaukee and other cities. A striking fact of the Philadelphia report was that the number of passengers carried per trainman in that city increased from 72,405 in 1911 to 151,175 in 1926. Rides per capita in Philadelphia have increased from 329 in 1911 to 480 in 1926.

Not only this, but the reports reflect the good work that is being done in accident prevention. The Louisville Railway's accidents have been reduced from 3,272 in 1922 to 1,157 in 1926, and the number of miles operated per accident has been increased from 3,323 in 1922 to 10,386 in 1926. On the Market Street Railway of San Francisco expenses incident to injuries and damages in 1926 were 30.18 per cent less than in 1925. Statistics indicate that collision accidents per car-mile in San Francisco were reduced 26 per cent.

Both the Market Street Railway and the West Penn

Railways gave important facts in the annual reports about the work being done toward strengthening their financial positions. The conditions surrounding the Market Street Railway are in many respects peculiar, but despite the low fare at which the company is required to operate and other unfavorable conditions, the funded debt in the hands of the public was reduced $634,000 during the year. The West Penn Railways retired $5,548,500 of funded obligations. On Sept. 1, 1926, the company called and retired all of its outstanding three-year 6½ per cent gold debentures due April 1, 1927, aggregating $3,500,000, funds having been made available to its treasury through reimbursements by certain subsidiary companies to which temporary advances had previously been made for construction. In addition, all of the company's outstanding first equipment trust 8 per cent notes of 1921, aggregating $120,000 were retired on Oct. 1, 1926.

The number of reports available in pamphlet form for digest is not so very large and the method of presentation of the data contained in them is so dissimilar that a basis of real comparison between companies is not afforded even if it were deemed advisable, but the conclusion is inescapable from the digests of the reports so far presented that the managements are for the most part thoroughly alive to the opportunity which is presented for the intelligent and determined application of ideas that give promise of furthering the interests of the companies themselves and of constantly increasing the essentiality of the properties to the welfare of the people in the communities in which they operate.

## Revival of Brady Award Should Stimulate Safety Work

CONSIDERABLE interest attaches to the announcement just made that the Anthony N. Brady safety award has been revived after remaining dormant since it was awarded to the Connecticut Company in 1916. The American Museum of Safety has taken charge of the contest and the next award of the medals will be for the calendar year 1926.

The conditions have been revised materially. Formerly a rather complicated series of computations was necessary to determine the winner, and the procedure made it difficult for the smaller companies to present their claims. Under the new conditions there will be three medals as before, but they will be given as first prizes to operating companies in three classes, grouped according to the number of vehicle-miles operated. The method of presentation has been modified greatly so that it will be possible for all electric railways, large or small, to present their own cases in the way that will bring out the best consideration of their records and the conditions under which their accomplishments have been made.

The plan under which the contest is to be conducted contemplates the preparation of a brief by each contestant presenting the accomplishments in gaining good will, improvements in maintenance and operating practices and promotion of sanitation and health, as a result of better safety practices. This will permit great latitude in presentations and will allow the committee in charge of the award to judge the work by a definite system of rating each of the six factors outlined in the conditions of the contest. The committee will also take into consideration any other factors or conditions which may in its judgment have a bearing on the relative accomplishments of the contestants in the field of safety.

It is desirable that as many railways as possible enter the competition. The conditions are not onerous and the amount of work that must be done in preparing the presentations should not be a hardship to any company. Separation of the companies into three groups, depending on size, gives the smaller companies an equal chance with the larger ones.

## I.C.C. Split on Valuation Issue

COMMENT has been provoked in railroad and financial circles by the majority opinion of the Interstate Commerce Commission in the so-called St. Louis & O'Fallon Railroad valuation case, one in which the principles involve railroad properties valued at billions. It is the first decision of the commission interpreting and applying the so-called recapture clause of the transportation act of 1920. By a vote of six to four, the commission held, in effect, that the value of the property of a railroad for rate-making purposes, as determined by the commission for 1914, approaches more nearly the reasonable and necessary investment in the property than the cost of reproduction of it. The recapture clause provides for the payment to the federal government of one-half of the net railway operating income of a railway system in excess of 6 per cent on its value for any year following the passage of the act. No definite rule of valuation was laid down in the transportation act of 1920. So the commission proceeded on its own initiative.

The majority opinion held that Congress intended to fix values of railroad properties for recapture purposes without awaiting completion of final valuation under the provisions of the valuation act. It also held that, for that purpose, it is warranted in basing its valuation on its tentative valuation figures of 1919 (based on 1914 unit prices) as far as available, plus net additions to property in succeeding years at actual cost, less depreciation, without giving effect to the cost of reproducing the original property at present-day prices.

According to one of the commentators who summarized the long decision, the majority opinion admitted that the "cost of reproduction now at prices current on valuation date" had been laid down as a rule in previous court decisions, but it objected that such a basis of rate making would prevent stability of rates; that in 1920, for instance, valuation at current prices would have required increase of 114.64 per cent in "the element of rates and charges" over the requirements as of 1914, in order to insure the "fair percentage" of return, whereas in 1921 there would have been a reduction of 14.38 per cent, and in 1922 a further reduction of 18.23 per cent. This the majority opinion deemed unjust and unworkable, and between that method and the use of 1914 prices as a base, no intermediate process was "possible which is capable of being applied to any rule independent of the caprice of those who apply it."

It might seem offhand that this case is without interest in the electric railway and utility field, but that is not a fact. In the first place, the commission, as indicated previously, was divided on the basis of a six to four vote, and in the second place the minority opinion rested its conclusion squarely on the "law of the land" as embodied in previous Supreme Court decisions. The

minority cited particularly one earlier leading decision, which acclaimed that, in valuing property used in serving the general public, consideration should be given to "present as compared with original cost of construction." Reaffirmation of this principle in the Minnesota rate case was further cited, also the Supreme Court's reversal of a lower court's decision in a public utility value, on the ground that the lower court had failed to accord "any weight to the greatly enhanced cost of material, labor, supplies, etc., over those prevailing in 1913, 1914 and 1916." The minority opinion bluntly declares that the commission's majority "refuse to follow" these clearly enunciated and definitely established principles. The basic use of 1914 prices is not challenged, but there is strong dissent from using them "in determining value in 1923 without application of corrective factors." The minority concludes that "if the law needs change, let those who made it change it. Our duty is to apply the law as it stands."

So the grounds become plain on which the radical divergence of opinion is based. They indicate clearly that the final and proper course of the commission cannot be determined except by the Supreme Court itself. In this respect it is quite clear that the issues were treated as test cases as to the method of ascertaining the value of roads for recapture purposes. The majority recognized that "having in mind the whole railroad situation, the decision is of the greatest consequence from the public and the private viewpoints." Both on that account and on account of the stand which the majority and the minority took in the matter, the case, despite the peculiarities of the terms of the transportation act, are of interest even to those who at first appear to be only remotely concerned with valuation problems.

## Those Who Came to Scoff Remained to Ponder

SKEPTICS who think that accidents are an inevitable accompaniment to electric railway operation certainly would have experienced a change of heart had they attended the April meeting of the Metropolitan Section, American Electric Railway Association, reported in this issue. Representatives of three important electric railways gave definite figures showing what had been accomplished by sustained effort on their properties. Since the beginning of an organized safety campaign on the Third Avenue Railway, New York City, fifteen months ago, the number of accidents has been approximately 1,400 less than during the preceding fifteen months. The total number of accidents on the Brooklyn City Railroad during the past eight months was 8,275 as compared with 9,518 occurring during a like period before the inauguration of the present bonus plan. In Louisville, where formerly one accident occurred for every 1,800 car-miles operated, the January, 1927, ratio was one per 19,000 car-miles. Claims paid by the Louisville Railway have been reduced from 7½ per cent of the gross revenue to 4 per cent. Evidence more convincing than these figures could hardly be found to show that the efforts made in accident prevention are thoroughly worth while from an economic standpoint.

While admitting that safety work was first undertaken for economic reasons, James P. Barnes, president Louisville Railway, pointed out that the humanitarian motive is now paramount. Much as his company has accomplished in the way of financial saving, he feels that the saving of life and limb has been of far greater importance. Moreover, united work in accident prevention has created a closer bond between the employee and the officials of the railway. Truly, in the case of this meeting it might be said that those who came to scoff, if any such there were, remained to ponder upon the substantial benefits resulting from organized safety work.

## Safety Platforms an Aid to Movement of All Traffic

TO THE prospective passenger waiting for a street car in the midst of a stream of rapidly moving vehicular traffic a raised loading platform is a great boon. Use of such safety platforms in most of the large cities of this country undoubtedly has prevented a great number of accidents. For this reason alone the moderate cost of construction is more than justified.

But the safety platform is more than a means of preventing accidents. It is a definite aid to the movement of all traffic. A nation-wide survey made by ELECTRIC RAILWAY JOURNAL, presented elsewhere in this issue, shows that executives of railway companies in cities where platforms are used are practically unanimous in the opinion that they speed up the operation of both cars and other vehicles.

Where loading platforms are used passengers are ready to board the car immediately it comes to a stop. Otherwise many of them wait on the sidewalk and make their way from the curb to the center of the street while the car waits. Moreover, stop-watch checks show that it takes less time for a passenger to board a car from a platform than from the street. Thus, there is a double saving of time, which in the aggregate amounts to many car-hours per day.

Vehicles other than cars should not be allowed to operate on the tracks inside the platforms. Otherwise cars are unable to draw up alongside the platform to their proper position, and one of the chief advantages of the platform is lost. The survey shows that the importance of this regulation is realized in most cities, although a few permit this harmful practice.

Loading platforms facilitate movement of other vehicles nearly as much as that of street cars. Most prospective car riders make their way from the sidewalk to the safety platform while the traffic is halted. Thus when the traffic is moving, greater speed can be attained with equal safety because of the small likelihood of pedestrians dashing out from the curb to reach the car tracks. Passengers alighting from cars have a safe place to stand and it is unnecessary for motor traffic to stop every time the car stops. All this has an important effect in relieving congestion where traffic is dense.

No uniform practice was disclosed by the survey in regard to paying for the construction of safety platforms. In some cities the railway has paid the cost, but in most instances this has been done by the municipality. As the platforms are built on public property and benefit not only the car riders but also the motorists, their construction appears to be a reasonable municipal expense. So favorable has been the experience of cities where these platforms have been used that municipal officials who understand their advantages should be quite willing to authorize their installation.

# Methods of Lighting Safety Platforms and Protecting Waiting Passengers from Vehicular Traffic

No. 1. Short vertical pieces of rail protect passengers on Cincinnati platforms.

No. 2. Covered platform 220 ft. long on Woodward Avenue, Detroit.

No. 3. Mushroom electric lights mark safety isles in Atlantic City.

No. 4. Rugged abutments are placed at both ends of Wilkes-Barre safety isles.

No. 5. High light on continuous safety isle at Providence.

No. 6. Substantial steel and concrete bumper at Atlanta.

No. 7. Flashing beacon used in Baltimore.

No. 8. Concrete bumper on safety isle at Terre Haute.

Concrete loading platform on Market Street, San Francisco, the first city to install these aids to railway operation

# Safety Platforms Aid Traffic Movement

**Survey shows use of raised loading areas alongside street railway tracks in 30 cities has greatly facilitated operation of cars and all vehicular traffic. Details of construction and lighting are given**

*By John A. Miller, Jr.*
Associate Editor *Electric Railway Journal*

RAISED loading platforms, or "safety isles," alongside street railway tracks have come into use in many of the larger cities of the United States during the past few years. San Francisco, where such platforms were installed 22 years ago, was the pioneer in this development. Today they are used in Chicago, Philadelphia, Detroit, Los Angeles, Cleveland, St. Louis, Baltimore, Pittsburgh, Newark, Washington, Cincinnati, Indianapolis and numerous other cities. In order to secure definite information concerning the construction and use of these platforms a survey has been made by ELECTRIC RAILWAY JOURNAL and the results are given in this article. This shows that officials of railways in 30 of these cities are agreed in thinking that loading platforms are a substantial aid to the expeditious movement of all traffic, as well as a great protection to the car riders and pedestrians.

Dimensions of the loading platforms vary widely in different cities, but the general design usually is much the same. An accompanying table gives the principal dimensions of loading platforms used by 27 railways in 30 cities. Materials used in their construction and the agencies by which they were built also are listed. Except in a few instances the material used is concrete. The Capital Traction Company builds platforms of wood on Pennsylvania Avenue, Washington, D. C., on account of the necessity of removing them during parades. Wood platforms are used also at Cambridge and Worcester, Mass.; Akron, Ohio, and Louisville, Ky. Platforms of precast reinforced concrete slabs are used by the United Railways & Electric Company of Baltimore. These are built in 8-ft. sections at the company's material yard, as shown on page 644.

In length the platforms vary from 18 ft. to 215 ft. Those shorter than 50 ft. are the exception. Lengths between 50 ft. and 100 ft. are the most common. Among the users of platforms more than 100 ft. in length are the Northern Ohio Power & Light Company at Akron, where the platforms are 150 ft.; the Capital Traction Company, 192 ft.; the Worcester Consolidated Street Railway, 200 ft.; the Los Angeles Railway, 215 ft., and the Department of Street Railways, Detroit, 220 ft. Triple or quadruple berthing of large cars is possible at these long platforms, while elsewhere the usual practice is double or single berthing. At the other extreme of size is Seattle, where the platforms are only 18 ft. long. This length has been adopted because all passengers board and alight at the rear end.

Widths of loading platforms vary between 3 ft. and 8 ft. Most common are widths of 4 ft., 4 ft. 6 in. and 5 ft.

**Principal Dimensions of Loading Platform**

| Railway | Length | Width | Height from Pavement | Distance from Rail |
|---|---|---|---|---|
| Atlantic City & Shore Railroad | 50 ft. | 4 ft. 0 in. | 5½ in. | 2 ft. 3 in. |
| Boston Elevated Railway | 100 ft. | 5 ft. 0 in. | 6 in. | 2 ft. 3 in. |
| Capital Traction Company | 48 ft. to 192 ft. | 4 ft. 4½ in. and 6 ft. 0 in. | 8½ in. | 2 ft. 0 in. |
| Chicago Surface Lines | 50, 70 or 100 ft. | 4 ft. 0 in. | 6 in. | 2 ft. 9 in. |
| Cincinnati Street Railway | 50 ft. | 4 ft. 6 in. | 6 in. | 1 ft. 6 in |
| Cleveland Railway | Various | 3 ft. 6 in. and 4 ft. 0 in. | 6 to 8 in. | 2 ft. 1 in. to 2 ft. 2 in |
| Department of Street Railways, Detroit | Various | 8 ft. 0 in. | 6 in. | 1 ft. 10 in. |
| Georgia Power Company | 100 ft. | 4 ft. 6 in. | 8 in. | 1 ft. 10 in. |
| Indianapolis Street Railway | 108 ft. | 6 ft. 0 in. | 4 in. | 2 ft. 1 in. |
| Los Angeles Railway | 50 to 215 ft. | 3 ft. 2 in. to 4 ft. 5 in. | 5, 8, 9 in. | 2 ft. 6 in. to 2 ft. 10 in |
| Louisville Railway | 80 ft. | 4 ft. 6 in. | 8 in. | 2 ft. 0 in. |
| Market Street Railway & Municipal Railway, San Francisco | 60 ft. 2 in. | 6 ft. 0 in. | 6 in. | 2 ft. 8 in. |
| Morris County Traction Company | 35 ft. | 4 ft. 0 in. | 5 in. | ..... |
| Northern Ohio Power & Light Company | 50 to 150 ft. | 4 ft. 0 in. | 5½ in. | 2 ft. 4 in. |
| Pittsburg Railways | 50 to 100 ft. | 4 ft. 6 in. | 5 to 6 in. | 1 ft. 4 in. |
| Philadelphia Rapid Transit Company | 80 ft. | Various | 4 to 5 in. | 1 ft. 10 in. |
| Public Service Railway of New Jersey | 50 to 100 ft. | 5, 6, 7 and 8 ft. | 4 to 8 in. | 1 ft. 10½ in. to 2 ft. 5 in |
| San Diego Electric Railway | 30 ft. | 6 ft. 6 in. | 8 in. | 2 ft. 4 in. |
| Schenectady Railway | 80 ft. | 6 ft. 0 in. | 6 in. | 2 ft. 0 in. |
| Seattle Municipal Railway | 18 ft. | 6 ft. 0 in. | 6 in. | ..... |
| Terre Haute, Indianapolis & Eastern Traction Company | 80 ft. | 5 ft. 0 in. | 4 in. | 1 ft. 6 in. |
| United Electric Railways, Providence | 4,000 ft. | 3 ft. 6 in. | 6 in. | 2 ft. 6 in. |
| United Railways & Electric Company, Baltimore | Various | 4 ft. 0 in. | 6 in. | 2 ft. 0 in. |
| United Railways, St. Louis | 100 ft. | 4 ft. 7 in. | Slope 2 to 5¼ in. | 1 ft. 7 in. |
| Wilkes-Barre Railway | 60 ft. | 4 ft. 0 in. | 6 in. | 2 ft. 1¾ in |
| Worcester Consolidated Street Railway | 80 to 200 ft. | 3 ft. 0 in. to 6 ft. 0 in. | 8 in. | 1 ft. 10 in. |

Considerable variation occurs also in the distance from the gage line of the rail to the inside edge of the platform. This distance is governed by the clearance line of the car. To avoid accidents platforms usually are so placed that an unfolded step will not overhang more than a few inches, but this practice is not always followed. At Pittsburgh the distance is 1 ft. 4 in. At Cincinnati and Terre Haute it is 1 ft. 6 in. From these figures the distances range upward to 2 ft. 9 in. at Chicago and 2 ft. 10 in. at Los Angeles. Probably the average distance is about 2 ft.

Height from pavement to top of platform varies from a minimum of 4 in. to a maximum of 9 in. Six inches is the most usual height. A sloping platform is used at St. Louis. On the side nearest the rail its height is only 2 in., while on the outside the height is 5¼ in. A sectional view is shown in accompanying drawing.

### Municipalities Pay Cost of Building Platforms

Cost of construction of loading platforms is borne by the municipalities in most instances, although there are also a number of cities where the railway has paid the entire expense. At Philadelphia, San Diego and at Worcester the cost is shared by the municipality and the railway. The city of Los Angeles has paid for the building of combination comfort stations and safety isles, but the ordinary loading platforms are paid for by the railway.

**Precast slabs for loading platforms built by United Railways & Electric Company, Baltimore**

Lighting of safety isles and protection against being overrun by vehicular traffic are prominent features of design. Nearly all of the platforms are provided with some sort of warning lights. In many instances they are placed only at the end toward approaching vehicles, but usually they are to be found at both ends. Often ornamental iron posts are employed as shown in accompanying sketches. Oil lanterns are utilized by the Capital Traction Company, the Louisville Railway, the Terre Haute, Indianapolis & Eastern Traction Company, the Georgia Power Company and the Worcester Consolidated Street Railway to light safety isles in the cities where these companies operate. An advantage claimed for this method is its independence of the general street lighting system. In case of failure of the street lights, the warning lanterns on the loading platforms continue to burn. At Seattle the lamps on the safety isle are tapped from the trolley wire. Gas lights are used on safety isles in some of the New Jersey suburban towns in which Public Service Railway operates. In Atlantic City the concrete loading platforms have mushroom electric lights at both ends. Flashing beacons are used in Chicago, Pittsburgh, Providence, Baltimore and St. Louis. Red reflectors at the end toward approaching traffic serve as auxiliary warning devices on numerous platforms.

### Protection an Important Element

To protect people waiting on the platforms from vehicular traffic, bumpers of various kinds are generally installed. Ordinarily a bumper is placed at only the approach end of the platform, although in some instances bumpers have been built at both ends, as was done in the Wilkes-Barre safety isles shown in an accompanying illustration. Concrete or reinforced concrete is frequently used for this purpose. Pieces of old rail often are buried

**sed by 27 Railways in 30 Cities**

| Material | Built by | Lighting | Type of Protection | Period of Use |
|---|---|---|---|---|
| Concrete | City | Mushroom Electric | None | 3 years |
| Wood | Railway | None | Pipe stanchions | 1½ years |
| Wood | Railway | Oil lanterns | None | 10 years |
| Concrete | City | Flashing Beacon | Bumpers | 3 months |
| Concrete | City | Electric beacon | Short pieces of rail | 6 months |
| Concrete | City | Electric lights | Concrete bumper | ..... |
| Concrete | City | Electric lights | Concrete bumper | 7 years |
| Concrete | Railway | Oil lanterns | Concrete bumper | 1 year |
| Concrete | City | Electric lights | None | 10 years |
| Concrete | City and railway | Electric lights and reflectors | None | 5 years |
| Wood | Railway | Oil lanterns | Wood and concrete pedestal | 1 year |
| Concrete | City | Electric lights | Concrete bumper | 20 years |
| Concrete | City | Electric lights | Reinforced concrete post | 3 years |
| Wood and concrete | Railway | Electric lights | Pipe stanchions | 2 years |
| Wood | Railway | Flashing beacons and reflectors | None | 5 years |
| Wood | City | Connected with traffic lights | Stanchions | 1½ years |
| Concrete | City | Electric and gas lights | Concrete bumper | 6 years |
| Concrete | City and railway | Electric lights | Concrete bumper | 1½ years |
| Concrete | City | None | Pipe stanchions | 5 months |
| Concrete | Railway | Tap from trolley | Concrete bumper | 6 years |
| Concrete | Railway | Oil lanterns | Concrete bumper | 2 years |
| Concrete | City | Flashing beacons | None | 4 months |
| Precast concrete | Railway | Flashing beacons | None | 4 years |
| Concrete | City and railway | Flashing beacons | Concrete bumper | 6 months |
| Concrete | Railway | Electric lights | Concrete bumper | 6 months |
| Wood | City | Oil lanterns | None | 3 months |

in the concrete to give added strength. At Cincinnati short pieces of vertical rail imbedded in the pavement create a substantial barrier. At Newark the concrete bumper has been extended to form a bench on which waiting passengers may sit. Sometimes these bumpers are painted with black and white stripes to attract attention. The Georgia Power Company in Atlanta utilizes the bumper to carry a list of the car lines passing that point. Pipe stanchions and chains are used by the Boston Elevated Railway and the Northern Ohio Power & Light Company. On the other hand, in a number of cities reliance is placed entirely on the height of the platform above the pavement to prevent encroachment by vehicular traffic.

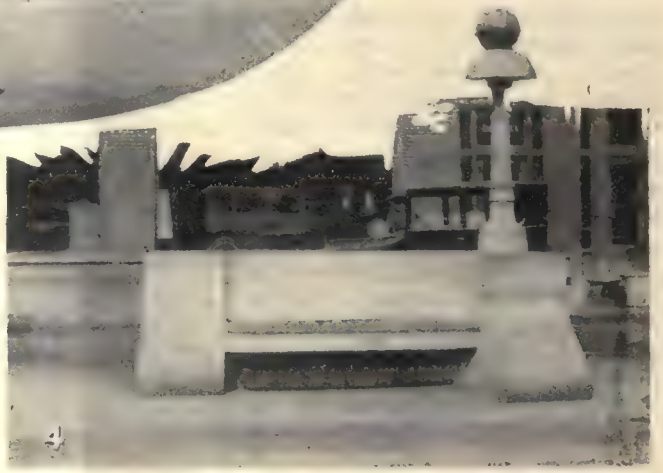
### Continuous Safety Isle at Providence

Perhaps the most unusual type of loading platform disclosed by this survey is one located on North Main Street, Providence, R. I. This extends alongside the tracks of the United Electric Railways from Grand View Street to Eighth Street, a distance of 4,000 ft. It is built of concrete, 3 ft. 6 in. wide and 6 in. high. At intersecting streets there are gaps in the platform to permit vehicular traffic to cross from one side of North Main Street to the other. At the end of these platforms and in the middle of the intersecting streets flashing beacons have been placed. The effect of this construction is practically equivalent to providing a reserved strip in the center of the street for railway operation.

Opinion of railway officials is quite definite that the minimum width of roadway between curbs is 44 ft. where loading platforms are to be installed alongside double track. Assuming that a double-track street railway utilizes 18 ft. of roadway, there remains 26 ft. for other vehicles, of which 13 ft. will be on each side of the track. If the width of the platform is 4 ft., there remains a 9-ft. lane for vehicular traffic. A few officials consider it desirable to have an even wider roadway between curbs where platforms are used, specifying street widths up to 60 ft. Again, assuming 18 ft. for the railway and 4 ft. for each platform, there remains a vehicular roadway of 17 ft. on each side, which may be considered sufficient for two lanes of traffic.

In harmony with this conclusion is the opinion that the roadway should be at least 36 ft. from curb to curb in a street where loading platforms are used alongside a single track. Assuming that 10 ft. is required for the cars and 4 ft. for the platform, there remains a 9-ft. vehicular roadway on each side of the street.

Wood platforms used by Capital Traction Company on Pennsylvania Avenue and Fifteenth Street, Washington, D. C., are built in sections to facilitate removal during parades



**Loading platforms are used extensively along the lines of Public Service Railway, Newark, N. J.**

No. 1. Platforms at Broad and Market Streets, the busiest intersection in the city, are 96 ft. in length.
No. 2. Latest type platform, which accommodates two cars.
No. 3. In the suburbs some platforms are lighted by gas.
No. 4. Combination concrete bumper and seat at end toward oncoming vehicles.
No. 5. Lamp post at unprotected end of platform.
No. 6. Passenger boarding front entrance car at platform.

In congested areas loading platforms speed up railway service because they "enable people to be at the boarding point as the cars approach instead of standing on the sidewalk and then threading their way through a maze of traffic to reach the car after it has stopped." Such is the opinion of A. E. Potter, president United Electric Railways, Providence, R. I. A similar opinion is expressed by J. B. Stewart, Jr., general manager Cincinnati Street Railway, who says: "Passengers are on the platform ready to board the car instead of being on the curb, which delays the car while passengers are trying to get across among the automobiles."

According to A. T. Warner, general manager in charge of traffic Public Service Railway, Newark, N. J.,

**Types of loading platforms used in Los Angeles, Cal.**

No. 1. Three-car platform at heavy loading. Length, 150 ft.; width, 4 ft. 6 in.; height, 8 in. Built by Los Angeles Railway.

No. 2. Obelisk protection at end of platform. Length, 50 ft.; width, 4 ft. 5 in.; height, 5 in. Built by Southern Pacific Company.

No. 3. Loading platform on private right-of-way in suburbs.

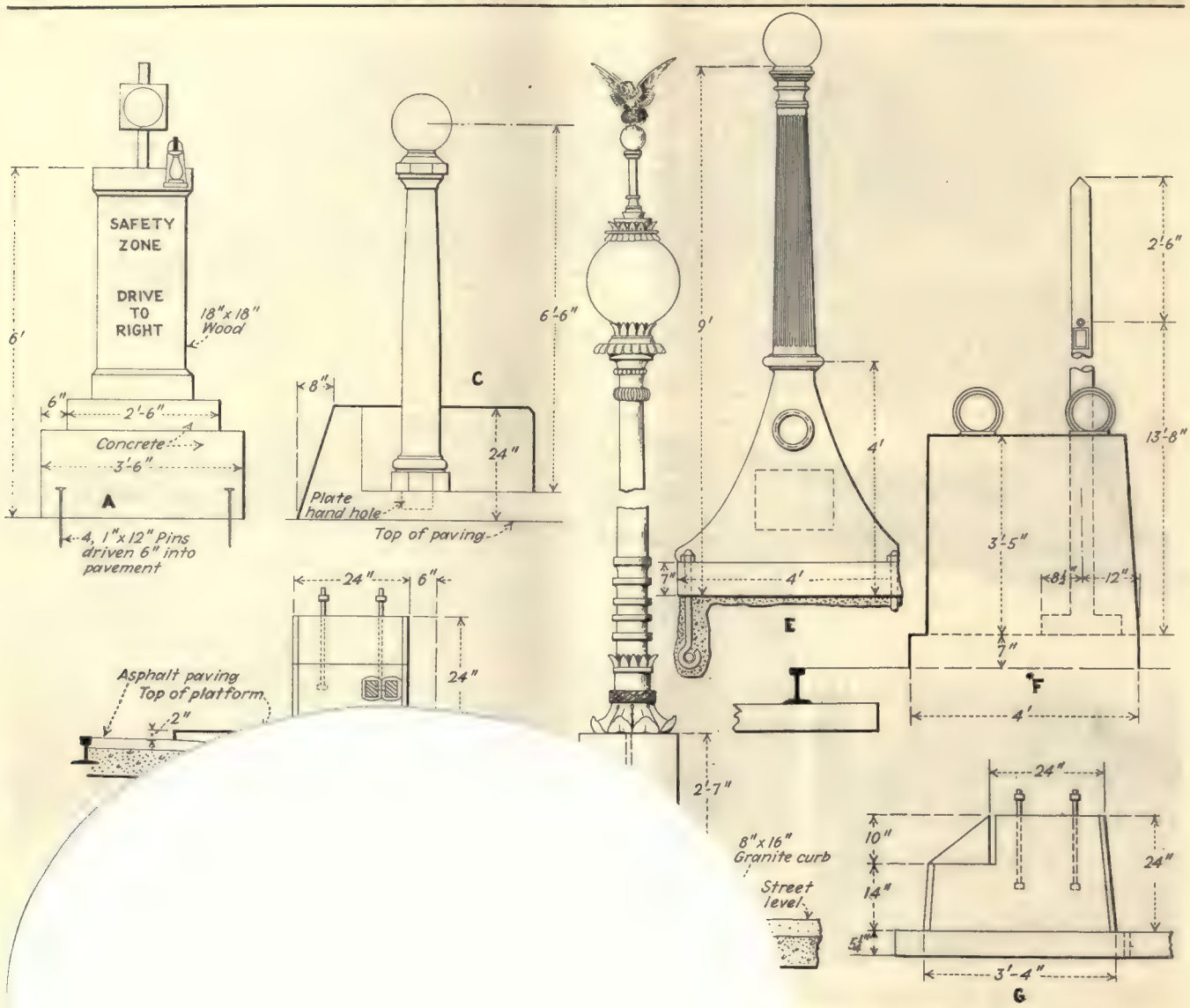
No. 4. Raised concrete platform alongside reserved strip. Length, 50 ft.; width, 3 ft. 2 in.; height, 5 in. Built by Los Angeles Railway.

No. 5. Combination comfort station and raised loading platform. Length, 92 ft.; width, 15 ft. to 31 ft.; height, 5 in. and 11 in. Built by city.

"There is no question but what a safety isle properly located has a number of advantages both from the public point of view and that of the operating company. First, it definitely establishes a point at which the cars will stop. Second, and of equal importance, it provides a haven of refuge adjacent to the track where prospective passengers can rest in safety while waiting for their cars. It also speeds up loading by making it possible for the passenger to be at one point ready to board the car when it arrives there." Stop-watch checks made at Newark show that it takes considerably less time for a passenger to board a car from a platform than the pavement.

Among others who expressed the opinion that the use of loading platforms speeds up railway service are Samuel Riddle, vice-president Louisville Railway; M. McCants, general manager Market Street Railway, San Francisco; T. H. David, principal assistant engineer Terre Haute, Indianapolis & Eastern Traction Company; R. E. Weber, engineer way and structures Schenectady Railway; D. A. Scanlan, general superintendent of railways Northern Ohio Power & Light Company; O. G. Schultz, general manager Morris County Traction Company; S. E. Mason, general manager San Diego Electric Railway; D. W. Henderson, general superintendent of railways, Seattle; A. J. Purinton, general superintendent Atlantic City & Shore Railroad; H. R. Whitney, vice-president Worcester Consolidated Street Railway, and C. A. Smith, superintendent of roadway Georgia Power Company.

On the other hand, doubt was expressed by E. J. McIlraith, staff engineer Chicago Surface Lines, and




k safety platforms

installed at Atlanta, Ga.
F. End view of loading platform at East Cleveland, Ohio.
G. Side view of bumper on loading platform in St. Louis, Mo.

R.
Rail
use o
the diffic
signal lights, th
sible advantages of the
is concerned.

Opinion as revealed by the survey was practically unanimous that raised loading platforms are superior to safety zones marked by paint, buttons or stanchions. W. R. Dunham, Jr., executive engineer Department of Street Railways, Detroit, believes that platforms are superior, but not sufficiently so to warrant the additional expense. If stanchions are rugged enough to prevent the encroachment of vehicular traffic the safety zone is as satisfactory as the raised platform, according to C. W. Wilson, research manager Pittsburgh Railways. Safety zones marked by cast-iron buttons set in the pavement are used to a considerable extent. More than 150 such zones have been established in San Francisco, according to M. M. O'Shaughnessy, city engineer. A post type safety zone built in that city at Market and Stockton Streets in 1925 has proved very

Detroit, Denver, Terre Haute and San
other cities using buttons or posts to mark
nes. The majority opinion in favor of raised
rms, however, is well expressed by R. H. Dalgleish,
ef engineer the Capital Traction Company, who says: "We consider the platform much more desirable than the painted safety zone as it affords better protection to waiting passengers."

Practice concerning the operation of vehicles other than cars inside the loading platforms is not uniform throughout the country. In some cities it is permitted. At San Francisco it is forbidden on Market Street and permitted elsewhere. In Los Angeles automobiles intending to make a left turn are required to stop inside the loading platforms and wait for the signal light permitting the turn. This practice has resulted in considerable interference to railway operation. In Schenectady buses are permitted to use the space between the platforms, but other vehicles are not allowed to do so. In a majority of cities from which information was secured in this survey general vehicular traffic is not allowed to pass inside the platforms. Opinion of operating officials strongly supports this regulation.

A 40-ton locomotive built by the Interstate Public Service Company from discarded material of two old bridges

# Locomotives Constructed Out of Bridge Material

By C. M. Bange
Master Mechanic Interstate Public Service Company, Scottsburg, Ind.

When two large bridges were replaced in southern Indiana considerable steel in good condition was available. Some of this was used by the Interstate Public Service Company in the construction of a high-speed 40-ton locomotive in the Scottsburg shop. The locomotive will be used to haul freight between Indianapolis, Ind., and Louisville, Ky.

Working drawings were first prepared and the work laid out under the direction of the master mechanic. Credit for the splendid construction, however, belongs to the men in the shop.

The engine is 35 ft. long over bumpers, the central cab being 21 ft. in length. Truck centers are 18 ft. and the total height from rail to trolley base is 13 ft. 2 in. The two trucks are equipped with 34-in. rolled steel wheels.

Steel is used throughout in the construction of the cab except the floor and inside sheathing. The roof is steel, except for a wood platform to protect the crew when working on a live trolley. The window and door casings are made of No. 12-gage steel bent to the proper

At left—Motorman's position on one of the Interstate locomotives. At right—Plates removed from the control cabinet show mounting of the control equipment in the Interstate 40-ton locomotive

angle and then welded at the joints and riveted to form a watertight job.

All equipment is carried above the floor line except the air compressor and brake cylinder. Reservoir tanks and sand supply are carried on the open platforms. Heavy iron railings guard the platform ends.

Propulsion equipment consists of four Westinghouse 303-A motors, 115 hp. each, geared 16:61. Control equipment is a modification of the General Electric type M, built from material on hand. Two type C6-K ten-point controllers are used, mounted in each motorman's position. All wiring is in metal conduit. Type MS-14 switches are used for control circuits, lighting and air compressors.

Westinghouse type 14-EL straight and automatic air brakes are used with a provision for using straight air on the locomotive alone.

The locomotive has a free running speed of 45 m.p.h. when running light and will haul eight to twelve loaded cars at 22 to 28 m.p.h. The cab arrangement allows full visibility in all directions. With the compressor mounted below the floor the noise is eliminated and comfortable quarters for the train crew are thus provided.

## P. R. T. Bus Is Featured at the Philadelphia Home-Building Show

EACH year a home-building show is held in Philadelphia. Each year the Philadelphia Rapid Transit Company stages a comprehensive exhibit at this affair to stress the fact that adequate public transportation is indispensable to the development of a community of homes. During the show this year, which was held in the First Regiment Armory, Feb. 7-12, it was again decided to use one of the company's de luxe gas-electric parlor car type buses for the central element in the exhibit. While in the opinion of the company these units are not the type usually employed to serve newly developed residential sections, they nevertheless have a very beautiful appearance and were well adapted for a public exhibit, the comfort of the seats making them a popular resting spot for the visiting public. To encourage visitors to enter the bus and gain an impression of its roomy and comfortable interior arrangement the scheme was hit on of placing a transparent screen on the front windshield and then throwing moving pictures upon it from a machine placed directly in front of the bus.

Several reels of pictures, filmed by the P. R. T., were used, one of these gripping dramas being entitled "What the Motorman Sees," while another took the spectators on a trip through "Industrial and Historic Philadelphia." The former proved to be the most popular, particularly with the younger visitors, who swayed from side to side and squealed excitedly as the car in which "our hero" was stationed bore down upon careless automobilists and pedestrians. The films were run at frequent intervals throughout the day and evening and the S. R. O. sign had to be hung out at each performance.

Representatives of the street car, bus and Yellow Cab divisions of the company were on hand in uniform to hand out literature to the public and to answer any questions which might be asked. There was also an ex-service man on hand in his army uniform to answer questions concerning the service which the Mitten Men and Management Bank and Trust Company has been rendering to veterans in extending loans on their adjusted service certificates. An added touch of reality was given to the exhibit by the array of baggage placed in the rack on the roof.

Progressive traffic control signals showing red and green lights simultaneously at alternate intersections were put in operation April 5 on Chestnut Street, Philadelphia. They replace the hand semaphores which have been in use recently. Some time ago the same electric signals were in use with a system of synchronized control. Comparisons will be made of traffic flow under the different systems.

One of the highlights of the recent Philadelphia Home-Building Show was the gas-electric bus exhibited by P. R. T.

# Meeting an Emergency

## in Nashville

The story of the methods used by the Nashville Railway & Light Company to maintain service during the floods of last December and January

Scene on the North First Street line. The water at this point was about 3½ ft. deep. In oval—Emergency transportation was given by the railway's line trucks and other vehicles, in addition to which other vehicles were rented

CRISES in the operation of transportation lines are relatively rare. Some of the unusual events can be planned for in advance, but when the forces of Nature combine to attack a whole city, as they did Nashville, Tenn., during the flood of the last holiday season, it takes heroic methods to combat them. While it is to be hoped that other transportation companies will not have the opportunity of adopting methods similar to those used by the Nashville Railway & Light Company in keeping up service, the record of the preparations made and the results obtained are of great interest.

A series of terrific rains, reaching a climax during Christmas week, was experienced in the Cumberland Valley and the vicinity of Nashville. The first part of Christmas week there was a 5.5-in. rainfall, but although river traffic was tied up, trains were running late and warehouses were being vacated, it was still hardly more than a high-water story to the newspapers. On Christmas Eve the gage showed a depth of 43 ft., but even then it was expected that the river would recede within 24 hours.

Radio station WLAC went on the air Christmas Day with the first news that people were fleeing in all directions and indicating the seriousness of the situation. The rain lasted until Dec. 28, with a total precipitation of 11.38 in. The water continued to rise until Dec. 29, reaching a height of 56.2 ft. and shattering the previous record of 55.2 ft., registered in 1882. Until Sunday, Jan. 2, the Cumberland clung to its high stage, then fell to 55 ft. the next day, thereafter falling much more rapidly until it was back to something like normal.

The river at one point was more than 3 miles wide. Practically all towns to the east of Nashville became isolated and mail had to be carried to them by airplane. All main highway cities to the east were cut off. When it approached its highest point the flood began to cripple street railway and bus service, with the ultimate result that thirteen of the Nashville Railway & Light Company's lines were under water. It is a matter of record that lines of the company were kept open despite the greatest handicap they ever operated under. This was accomplished only by the greatest effort and sacrifice of the employees. The majority of the men worked day and night, sticking to their cars and seeing that they did not shut down no matter what came. As a typical example, one man who was so zealous in his work actually was on his feet 48 consecutive hours without a wink of sleep.

### New Buses Played Heroic Part

It just so happened that when the flood reached the perilous stage seven new Yellow motor coaches purchased by the company had arrived from Chicago. To start with, the delivery of these coaches was held up about eight hours by floodwaters when 50 miles out of

This scene on the Jo Johnson line was typical of many backwashes throughout the city, where the cars continued to run

This shows the condition of the company's storeroom at the height of the flood. The men in the rowboat are salvaging poles and materials. At the extreme left a crane is attempting to raise a marooned street car

Another deep point was on the Shelby Street car line, where the water covered the tracks about 8 ft.

Nashville. These buses played a heroic part in the emergency, arriving just in time to go into service in order to transfer the very first water-marooned passengers around the flood area to waiting street cars.

In many instances the buses plowed through water right up to the motor. This service was performed under these strenuous conditions without any trouble and without any of the buses having either operating or mechanical difficulties of any kind, even though at times water ran right into the coaches themselves.

The flood situation became so bad that even these new motor coaches were unable to cope with the passenger transfer situation. The company pressed into service its overhead line trucks and every available motor vehicle. In addition outside equipment was rented to facilitate to the utmost the uninterrupted movement of passengers. At some points the car tracks were covered by 12 to 15 ft. of water. The following figures show the depth of water over points on the various routes:

| | |
|---|---|
| Jo Johnson line | 16.48 ft. |
| Lebanon line | 12.31 ft. |
| First Avenue South line | 10.2 ft. |
| North First Street line | 10.82 ft. |
| Fourth Avenue South line | 5.14 ft. |
| Main Street | 5.33 ft. |
| North Second Street | 4.79 ft. |
| Fourth Avenue North | 4.48 ft. |
| Cedar Street | 3.67 ft. |
| Fatherland Street | 1.53 ft. |
| Woodland Street | .2 in. |
| Sixth Avenue South | .67 in. |
| Third Avenue South | .62 in. |

Indicative of this condition the illustrations show the great depth of the water. In one will be noticed the car stop sign on the overhead guy line, which is just above the water line, indicating a depth of approximately 15 ft.

The company advertised in the local newspapers to keep its patrons informed from day to day as to the situation and to advise what steps had been taken to furnish them with transportation. One of these advertisements is reproduced herewith.

East Nashville is a distinct part of the town and there are three passenger bridges which connect it with the remainder of the city. Early in the flood, two of these three bridges were closed to traffic on account of the high water and the danger that they might collapse, the water having risen over the roadways on them. This left only one bridge open between the main part of the city and East Nashville, with the water continually rising. At this time the water height had broken a hundred-year record. The remaining bridge was the Woodland bridge, a steel structure,

NOTICE TO

STREET CAR PATRONS

SOUTH NASHVILLE

Outbound passengers on the Fairfield and Radnor lines will ride cars bearing these names, but which will be routed out Sixth avenue, south, to Sixth and Ash. At this point transfers will be given, acceptable at Ash and Third avenue, for the remainder of the Radnor or Fairfield trip.

Inbound Radnor and Fairfield passengers will transfer at Third and Ash to cars waiting at Sixth and Ash, for the remainder of the trip to town.

EAST NASHVILLE

Outbound passengers on the Shelby line will ride either Porter Road or Inglewood car to Third and Woodland, at which point transfers will be given, acceptable at Third and Fatherland on Shelby cars, which will complete the outbound trip.

Inbound Shelby passengers will be given transfers at Third and Fatherland, acceptable at Third and Woodland, for the remainder of the inbound trip.

NORTH NASHVILLE

All passengers on inbound St. Cecilia and Buena Vista street cars will transfer at Fifth Avenue and Jefferson street to Jefferson street cars. By street car and motor bus, passengers will be transferred from this point to Twenty-second avenue and Cedar, where inbound West Nashville cars will take them, by way of Church street, to the uptown business district and the Transfer Station. Patrons of the Jefferson street line will be transferred at Sixteenth avenue over to Jo Johnson street cars and on to Twenty-second avenue and Cedar, where West Nashville cars will take them to the uptown business district and the Transfer Station.

Patrons of the Jo Johnson line wishing to reach the business district will ride the Jo Johnson car to Twenty-second and Cedar, transferring there to West Nashville cars for the trip to the business district and the Transfer Station.

Patrons of the Cedar street line wishing to reach the business district will ride the Cedar street car to Twenty-second and Cedar, where they will transfer to West Nashville cars, going to the business district and the Transfer Station.

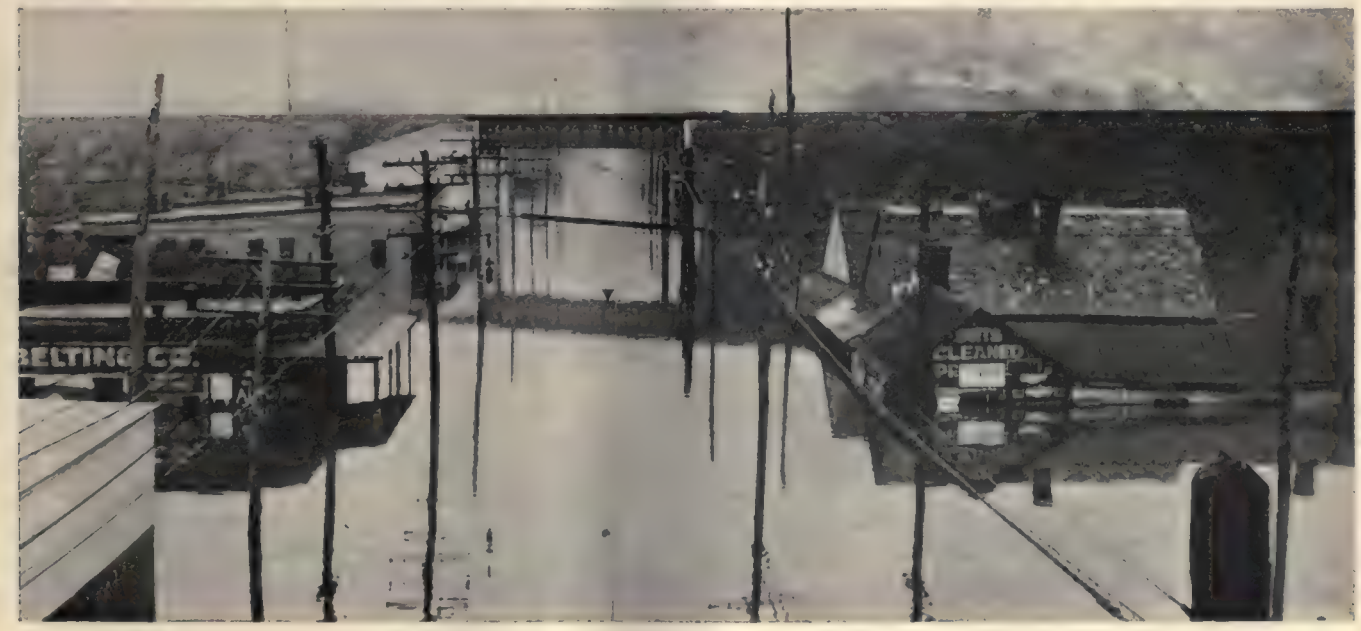
Patrons returning home on all the above lines will ride outbound West Nashville street cars to Twenty-second and Cedar, where they will be transferred to their respective street car lines.

THESE CHANGES IN SERVICE ARE DUE TO FLOOD CONDITIONS

The system of transferring on all other lines in the affected area remains unchanged.

Nashville Railway & Light Company

Advertisements like this one in the Nashville *Tennesseean* kept the public informed of the steps taken by the company to give emergency service



On the North Nashville car line the water was between 5 and 6 ft. deep

## What Public Officials Thought of the Railway's Flood Service

CITY OF NASHVILLE
NASHVILLE, TENN., Jan. 21, 1927.

Mr. J. P. W. BROWN, Vice-president
Nashville Railway & Light Company,
Nashville, Tenn.

MY DEAR MR. BROWN: I want to commend publicly your company for the outstanding service it rendered a distressed city during the worst flood in Nashville's history.

I am sure that the public at large sincerely appreciates the service rendered by your company in such an extreme emergency.

With best wishes for you and your company, I am,

Sincerely yours,
HILARY E. HOWSE,
Mayor.

CHAMBER OF COMMERCE
NASHVILLE, TENN., Jan. 21, 1927.

Mr. J. P. W. BROWN, Vice-president
Nashville Railway & Light Company,
Nashville, Tenn.

MY DEAR MR. BROWN: As president of the Nashville Chamber of Commerce, I want to take this opportunity to recognize and to commend the Nashville Railway & Light Company for its splendid service during the recent flood.

I have heard on every hand the most laudatory comment concerning the tireless efforts and splendid accomplishments of your railway, power and lighting departments in the face of a tremendous handicap. Your company not only met the emergency by transferring passengers in buses around the flood area, and by organizing your other departments for flood relief, but it also made a generous contribution to the fund for alleviating distress.

In all of this work, I am sure that you have strengthened your friendship with the people of Nashville, and in this expression I am sure that I reflect the appreciation of all Nashville.

Sincerely yours,
CHAS. M. MCCABE,
President Chamber of Commerce.

across which ran every street car line carrying passengers to East and Northeast Nashville. At this point centered the efforts of the railway. When the water started to climb on the east approach of the bridge it was realized that it would be only a matter of a few hours until East Nashville would be completely shut off from the rest of the city.

### TRESTLE BUILT READY FOR USE

A hurried conference was held called by J. P. W. Brown, vice-president, with the department heads and it was decided to keep the East Nashville lines open at any cost. The shop forces immediately went to work to build a railroad trestle, the material being cut and placed in the carhouse. The trestle was built and the rails actually placed on it in the shop and held there, so that it was all ready to rush to the scene the moment it became necessary to operate the cars through water. The plan was to erect this trestle over the existing tracks and run the trolley cars over it. However, as it was completed the flood started to recede and its use became unnecessary.

The property damage to the railway company's lines was not very great, but the company suffered a severe loss in revenue and was put to great expense in running the transfer service on the thirteen lines on which railway service had to be discontinued. The flood receded rapidly after passing the crest. Traffic was resumed by Friday, Jan. 7, on all lines.

Many letters were received by the company commending it on its meritorious service during these flood conditions. Outstanding among these were a letter from Mayor Hilary E. Howse and another from Charles M. McCabe, president of the Nashville Chamber of Commerce. Both of these letters are reproduced. They expressed the thanks of the residents of the city for the untiring efforts and the splendid accomplishments of the railway during the flood, although the company was operating in the face of tremendous handicaps.

In addition to the loss of revenue and the enormous expense the company was put to, it made a very generous contribution to the flood relief fund, for which subscriptions were solicited in the city, all of which received very favorable publicity.

The deepest water was on the Greenwood extension. A stop sign on the span wire may be seen in the distance just above the surface, indicating a depth of about 15 ft.

By the use of aluminum alloys for car framing and trucks this 51-ft. Cleveland car was made to weigh 30,300 lb., as compared with 43,200 lb. for the company's standard car of similar dimensions

# Cleveland Aluminum Car

## Proving Successful

**Experimental car built by Cleveland Railway to determine possibilities of using aluminum alloys in car construction develops no weakness after more than four months operation**

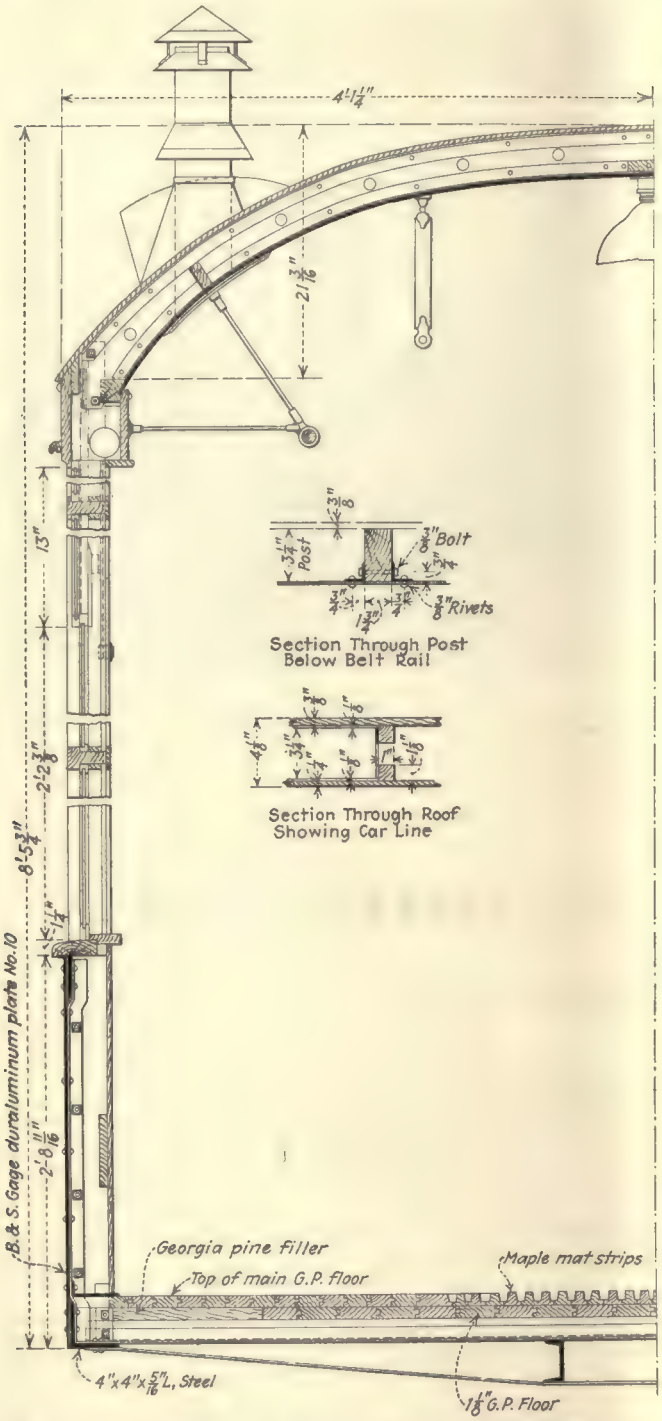
DURING the annual convention of the American Electric Railway Association at Cleveland last fall keen interest was shown by many delegates in the double-truck "aluminum" car for city service built by the Cleveland Railway. Since then many inquiries have been received by the company's officials from railway men in this country and abroad as to how this sample car has stood up in service. Due to the short time in which the car was built and the extent to which aluminum alloys were used for parts subjected to strains and shocks, even those who conceived the idea of building such a car expected that some weaknesses in the structure might develop after a period of operation under the severe service and loading conditions encountered in Cleveland. But more than four months of operation has failed to develop a single serious evidence of structural weakness.

The material used is duralumin, an alloy of aluminum with various combinations of magnesium, manganese, copper and silicon, to give the desired physical characteristics after heat treatment. This material, which is used extensively in the construction of aircraft, is obtained in form available for forgings, structural shapes, tubing and castings. It is claimed for duralumin that after it has been tempered the strength approaches that of mild steel.

### Used Standard Car Drawings

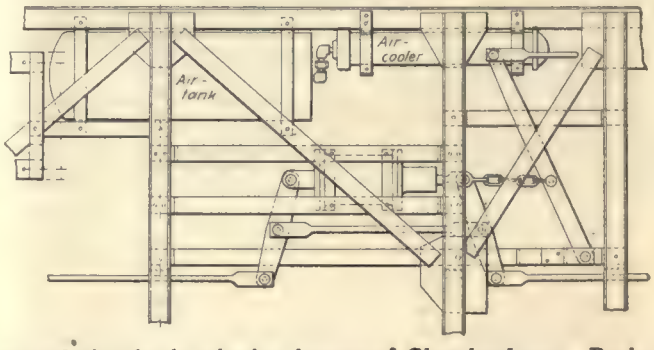
When J. H. Alexander, president of the Cleveland Railway, decided to go ahead with the construction of an experimental aluminum car for exhibit at the convention, time did not permit the structure to be specially designed for the new material. Consequently, the standard Cleveland drawings for a steel car of what is known as the 1300 type were followed, the duralumin being substituted for steel with practically no change in section sizes. The only parts in which the size was increased in aluminum alloys over steel were the body side sheets, the truck side frames and the body bolsters. The car was built in the Harvard shops of the railway company under the direction of Terence Scullen, master mechanic.

Except for the windows, doors, side sill angles, wheels, axles, springs, gears, journal boxes, air tanks, resistor grids, trolley base, motor magnet frames and the main body of the air compressor, the car structure and equip-



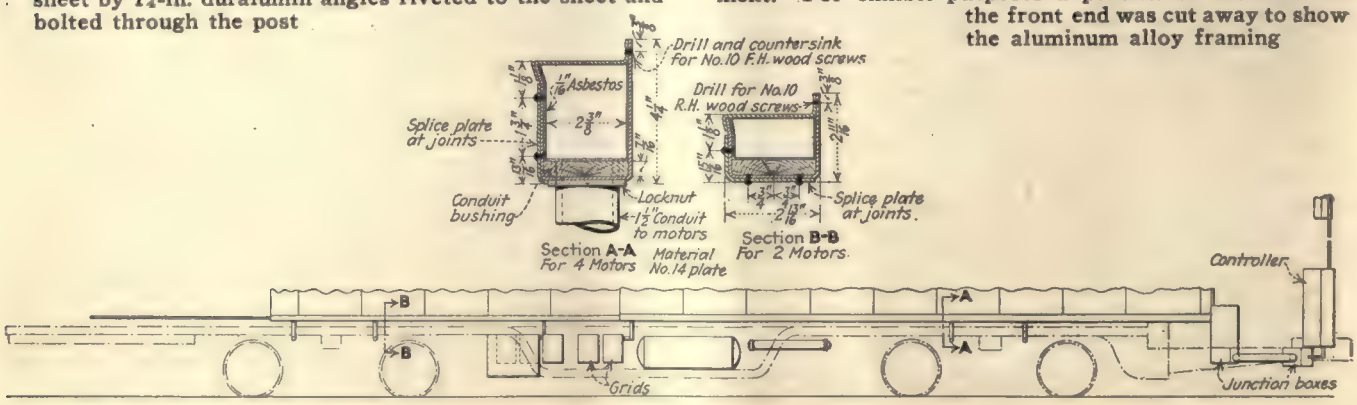

Vertical section through side framing of "aluminum" car. Side posts are wood, fastened to the duralumin side sheet by 1¼-in. duralumin angles riveted to the sheet and bolted through the post

View looking up under car, showing aluminum alloy framing members, apparatus hangers and door mechanism

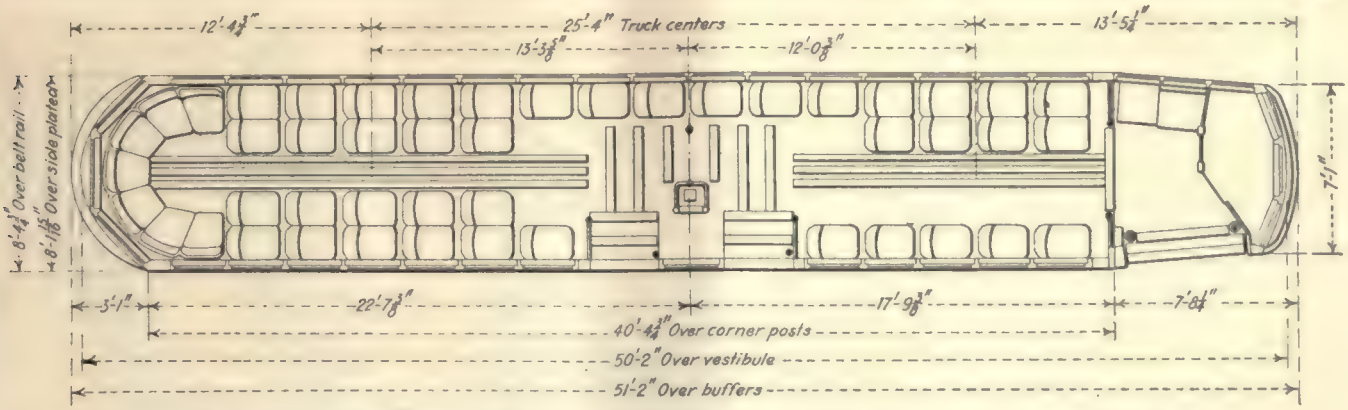



Foundation brake rigging layout of Cleveland car. Brake cylinder, levers and pull rods are aluminum alloy

Interior view of experimental "aluminum" car as exhibited during Cleveland convention, showing twin seat arrangement. For exhibit purposes a portion of the floor at the front end was cut away to show the aluminum alloy framing

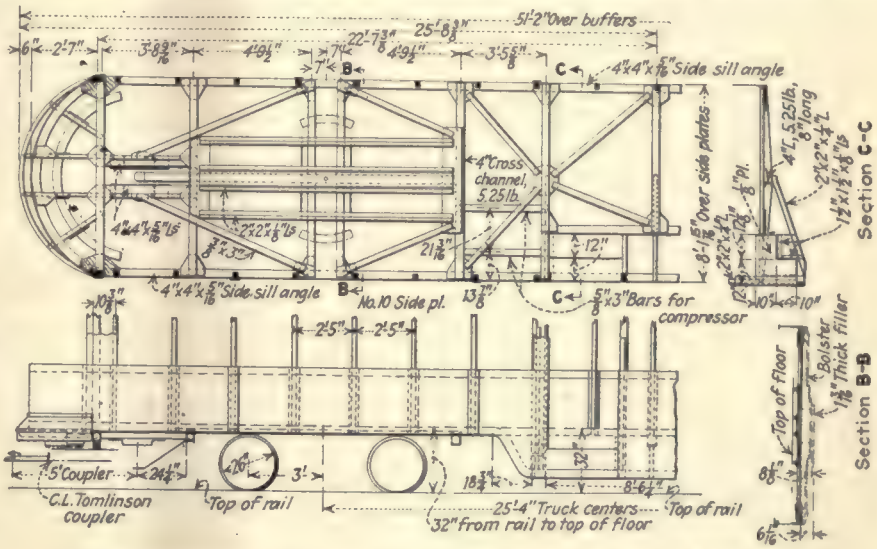



Special cable conduit arrangement used in Cleveland car. This is run above the body floor with outlets for motors and resistors as shown in diagram

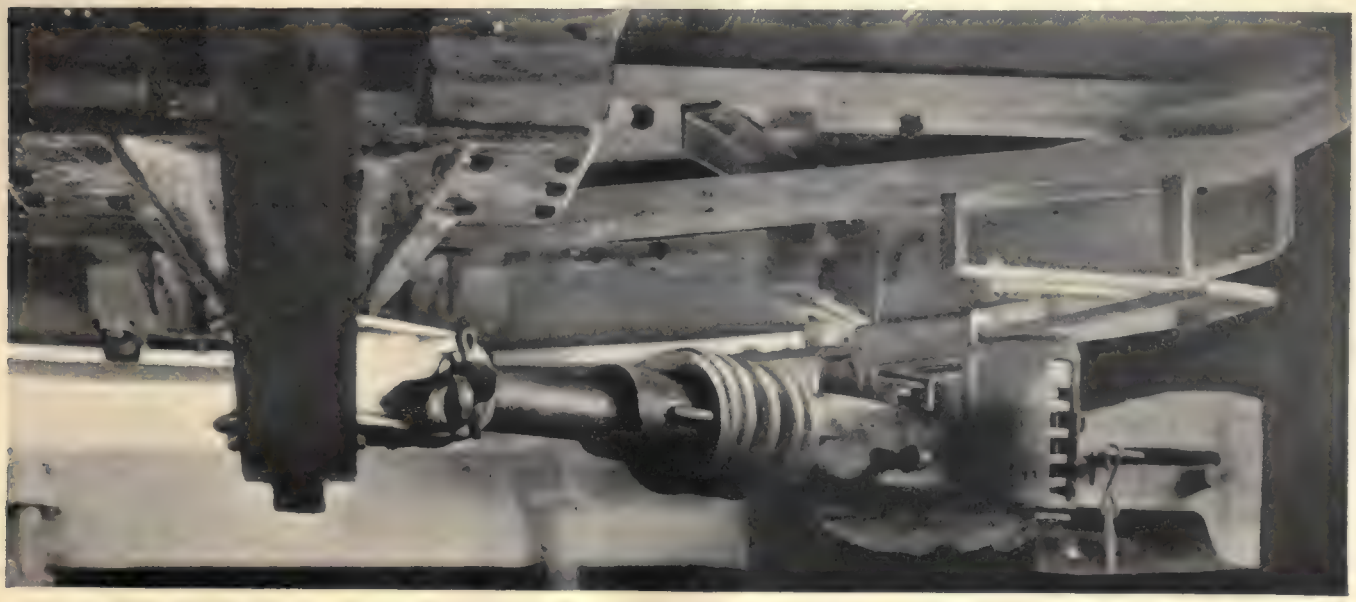



Comfortable individual seats in the Cleveland "aluminum" car are upholstered in rattan. The car is of the Peter Witt type, front entrance and center exit

ment are built almost entirely of duralumin. The material was furnished by the Aluminum Company of America in standard alloys of various compositions and physical characteristics depending upon the nature of the application. Rolled plates and extruded structural sections are made of what is known as 17-S alloy tempered to an ultimate strength of 55,000 to 60,000 lb. per square inch, yield point 30,000 to 40,000, elongation 18 per cent to 20 per cent, and modulus of elasticity 10,000,000. Standard commercial shapes in duralumin are made by the process of extrusion instead of rolling. In this process the alloy is heated until it has the consistency of jelly, and while in that condition is forced through dies into the desired shapes. The material used in forgings is called 15-S alloy and has practically the same physical characteristics as 17-S alloy except that the elongation is 16 per cent to 18 per cent instead of 18 per cent to 20 per cent. Duralumin tubing is made of 51-S alloy with an ultimate strength of 40,000 to 45,000 lb. per square inch, yield point 30,000 to 40,000 and elongation 10 per cent to 12 per cent. What is known as 195 alloy is used for castings. The normal characteristics of this material are: Ultimate strength, 28,000 to 30,000 lb. per square inch, yield point 15,000, elongation 6 per cent, and Brinell hardness 50. By varying the treatment of 195 alloy it is claimed that the ultimate strength can be increased to 36,000, the




Framing diagram of Cleveland car. Duralumin is used throughout with exception of bumper and side sill angles



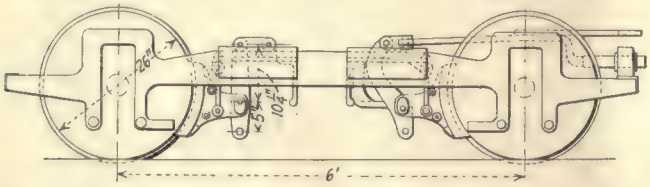
Coupler, anchorage casting and framing at rear end of Cleveland car are all made of aluminum alloys with the exception of springs and coupler hook

COMPARATIVE DATA ON THE STEEL AND ALUMINUM CARS

| | Steel | Aluminum |
|---|---|---|
| **General** | | |
| Class of car | Front-entrance, Center-exit | Front-entrance, Center-exit |
| Seating capacity | 49 | 49 |
| Standing capacity | 91 | 91 |
| Total load | 140 | 140 |
| Entrance arrangement | Front | Front |
| Exit arrangement | Center | Center |
| Car builder | Cleveland Railway | Cleveland Railway |
| **Electrical Equipment** | | |
| Motors per car (four) | Westinghouse 340 | Westinghouse 510-E |
| Horsepower per motor | 40 | 35 |
| Gear ratio | 15:57 | 13:69 |
| Control | K-35-G | K-35-KK |
| **Truck and Air Brake** | | |
| Air brake | SME straight air | SME straight air |
| Compressor | Westinghouse DH-20 | Westinghouse DH-20 |
| Truck, type | Brill 68-E-1 | Brill 68-E-1 |
| **Dimensions** | | |
| Length over bumpers | 51 ft. 2 in. | 51 ft. 2 in. |
| Length between truck centers | 25 ft. 4 in. | 25 ft. 4 in. |
| Truck wheelbase | 6 ft. 0 in. | 6 ft. 0 in. |
| Height from rail to top of roof | 10 ft. $\frac{9}{16}$ in. | 10 ft. $9\frac{7}{16}$ in. |
| Height from underside of sills to top of roof | 8 ft. $5\frac{3}{4}$ in. | 8 ft. $5\frac{3}{4}$ in. |
| Width of car body over side plates | 8 ft. $1\frac{13}{16}$ in. | 8 ft. $1\frac{13}{16}$ in. |
| Axle bearing diameter | $4\frac{1}{2}$ in. | $4\frac{1}{2}$ in. |
| Wheel diameter | 26 in. | 26 in. |
| **Weights** | | |
| Car body without trucks or equipment | 18,354 lb. | 13,851 lb. |
| Trucks per pair without gears | 12,096 lb. | 8,220 lb. |
| Motor equipment | 9,242 lb. | 5,720 lb. |
| Control equipment | 1,298 lb. | 827 lb. |
| Air brake equipment and piping | 1,764 lb. | 1,301 lb. |
| Heater duct and heater | 446 lb. | 381 lb. |
| Total weight without load | 43,200 lb. | 30,300 lb. |
| Saving by use of aluminum alloys | 12,900 lb. | |

yield point to 27,000 and the Brinell hardness to 80. In this condition, however, there is no elongation and the material is very brittle.

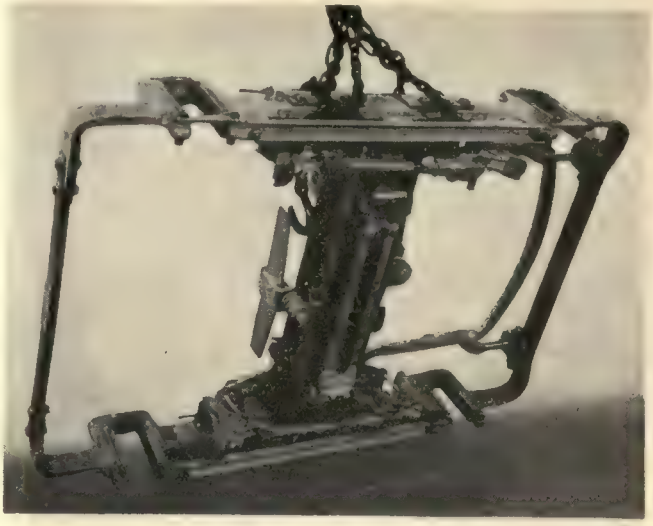
On the body the side sill angles, rear bumper, the left-hand support of the front platform and a few minor parts of the structure are of steel. The duralumin side sheets are 0.125 in. thick in place of the 0.102-in. steel




**Elevation drawing of Brill 68-E-1 truck. Side frames are made of forged duralumin**

sheets used on the standard cars. The body bolsters are cast of 195 alloy, having a section approximately 20 per cent greater than the steel castings for which they were substituted. The trucks are Brill type 68-E-1 with forged side frames. Here again duralumin was substituted, but the side frame section was made somewhat thicker than normal to allow a greater factor of safety. The truck bolsters are likewise made of forged duralumin. Although the motor magnet frames are necessarily of steel, the motor axle caps, armature bearing housings at both ends and the gear cases are aluminum. All heater ducts, piping, brake levers and pull rods, apparatus hangers and the brake cylinder are aluminum. Although it was not possible to make the entire compressor frame of duralumin, this material was used for the end castings of the frame. Even such parts as the Tomlinson couplers and anchorage castings are aluminum alloy in their entirety with the exception of coupler hooks and springs.

The rivets used throughout the body and truck are steel. It was not thought practical within the limited time available in building the car to attempt to develop a successful technique for hot driving and tempering aluminum alloy rivets in shops which were unfamiliar with their use.

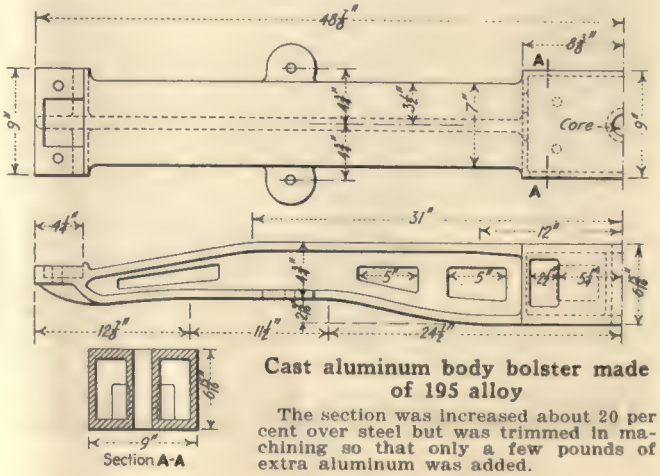


**Frames of the Brill 68-E-1 trucks are forged duralumin. Likewise brake rigging, bolster, transoms and spring plank are made of the lightweight material**

The car, which is shown in accompanying illustrations, is 51 ft. 2 in. long over the bumpers. Truck centers are 25 ft. 4 in. Height is 10 ft. $9\frac{7}{16}$ in. above rail and the car is 8 ft. $1\frac{13}{16}$ in. wide over side plates. It is of the front-entrance center-exit type with a seating capacity of 49 and an estimated standing capacity of 91, making a total carrying capacity of 140. Four Westinghouse 510-E, 35-hp. motors are used, with K-35-KK control. A Westinghouse DH-20 air compressor is provided. The car is glazed throughout with plate glass $\frac{1}{8}$ in. thick.

Since the "aluminum" car was built entirely on an experimental basis, no comparative cost figures are available. In general, the aluminum alloys weigh about one-third as much as steel and the cost per pound in structural form is roughly six times that of steel. For a given structure, then, the cost in duralumin would be about double the material cost in steel. Against this should be credited the scrap value of the aluminum alloy.

Based upon its experiences with the sample car, the Cleveland management has found no serious obstacle to the general application of duralumin to car construction. The saving in weight that is made possible by the use of the lighter material is strikingly shown in the accompanying tabulation, which gives the principal dimensions, specifications, and a comparison of weights for a standard 1300 type car built of steel and the "aluminum" car made from the same drawings.




**Cast aluminum body bolster made of 195 alloy**

The section was increased about 20 per cent over steel but was trimmed in machining so that only a few pounds of extra aluminum was added.

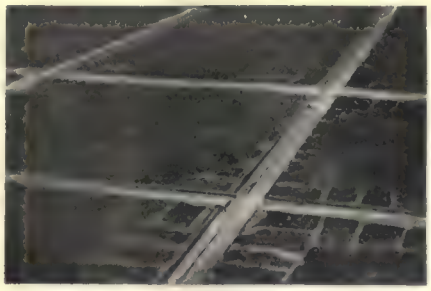
# Maintenance Notes

## Bearings Heated Over Slow Fire Before Babbitting

IF SUCCESSFUL babbitting of undersized journal and armature bearings is to be done, it is essential, in the opinion of J. W. Gordon, master mechanic Atlantic City & Shore Railroad, Atlantic City, N. J., thoroughly to remove all oil before beginning the process. This is accomplished in the shop of this railway by heating the brasses for one hour over a blacksmith's slow fire. Oil which has worked into the bearings is boiled out by this means. Only genuine babbitt metal is used. Babbitt that has been melted off armature brasses is used on journal brasses and axle bearings. For the armature bearings, however, only new metal is used. Due to the care in preparation of bearings, failures are said to have become practically a thing of the past on this road.

## Maintenance Cheaper with Built-Up Special Trackwork

EXTENSIVE use is made of built-up special trackwork by the Market Street Railway of San Francisco for both angle and 90-deg. crossings. This type of special work is considered economical to maintain because it allows for extensive repairs by means of electric welding. The built-up type of crossing is assembled of 9-in., 106-lb. grooved girder rail. One set of rails is carried through the crossing, the head being cut out to allow for the flangeway of the crossing rail. The other rails are in short sections fastened to the through rails by angle plates $\frac{7}{8}$ in. thick bolted directly to the short cross rails and through a $1\frac{1}{8}$-in. filler block to the through rails. The entire assembly is mounted on a $\frac{5}{8}$-in. steel plate 33 in. square. It is anchored by clips held in place with $\frac{7}{8}$-in. key head bolts. After the crossing is made up all bolts are spot welded to prevent loosening. As this is a flange-bearing crossing, two steel wheel riders are riveted into the grooves of the rails at the crossing. With this type of construction it is possible to build up by electric welding those portions of the short lengths of rail which have a tendency to wear.



Built-up crossing which has been maintained in satisfactory operating condition by electric welding on the Market Street Railway

Repairs to this type of crossing are made very easily. For instance, in the case of a damaged short section between joints in the crossing, a plug is made up of a section of rail head mounted on a joint plate. The plate is bolted to the web of the rail and the head welded into the cut-out section of the original rail head. It is then built up by electric welding and made a continuous portion of the original rail. Complete rebuilding of an entire double-track crossing costs the company approximately $500.

*A "hand to mouth" sustenance, applied to Maintenance, is downright extravagance.*

## Shoe Heads Ground Quickly

REALIZING that there was room for improvement in the method of grinding shoe heads, the Los Angeles Railway, Los Angeles, Cal., has constructed in its machine shop a very much improved machine for doing this work. One man with the new machine can grind from 150 to 180 shoe heads per day. This is 50 per cent more than by the previous

Grinding a shoe head by means of the new machine

method, which used a rocker arm attached to a standard grinding machine. The grinding operation is part of the work done in reclaiming old shoe heads. Worn portions, particularly the tips of old shoe heads, are built up by welding and are then brought to the desired surface by grinding.

The new machine consists of a cast-iron bed 30 in. high, 22 in. wide and 38 in. long. A coarse alundum grinding wheel, 14 in. diameter by 3 in. thick, is mounted at the top of the bed. The wheel is driven by a vertical 5-hp., 1,500-r.p.m. motor which is installed underneath the bedplate.

For grinding the shoe head is held on a radius arm which rotates about a vertical post. This post is 2½ in. in diameter and stands 18 in. above the bed. A feature of the new machine is the simple and quick adjustment so that shoes can be placed in position and removed quickly. A pin placed through the shoe head fastens it to the radius arm. This pin has a tapered key on the top side for quick adjustment. Adjustments are also made by two screws of four-pitch on either side of the pin holding the shoe head. This adjustment is used for grinding the ends so the grinding can be done either vertically or horizontally.

The radius arm is 20¼ in. long, kept constant regardless of the size of the grinding wheel. Adjustment for bringing the shoe head to the grinding wheel is made through a pitch screw that forces the supporting base for the upright post either forward or backward, in guides along the bedplate. In the accompanying illustration this is shown at the right-hand end of the machine. In the grinding work both automatic and hand feed are provided.

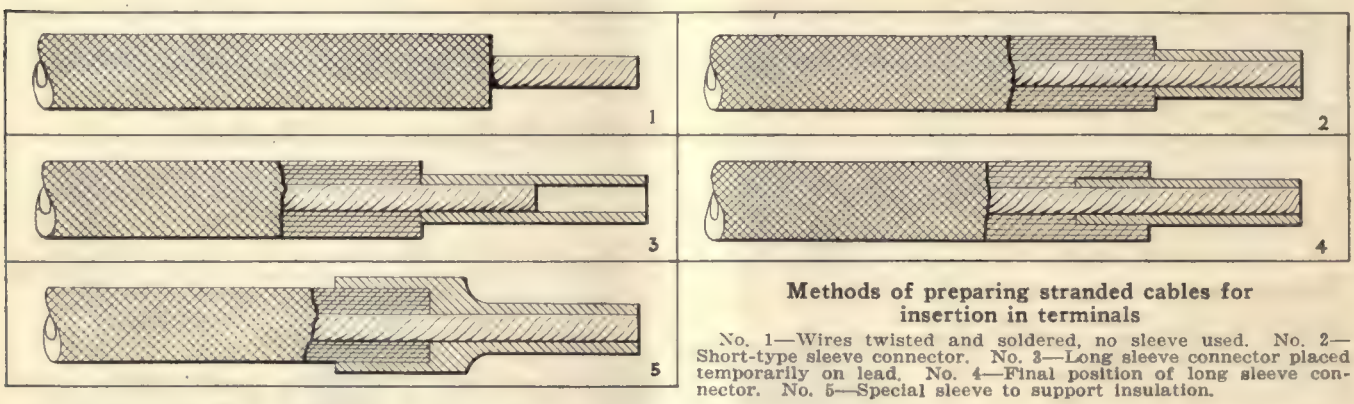
To provide against possible accidents the radius arm has a stop pin which comes in contact with a stop plate fastened to the bed of the machine. This prevents the radius arm from swinging too far and endangering the workmen.

With the old method of grinding the shoe head was held in position by nuts. After one point had been ground down the nuts had to be loosened and the shoe head changed to another point. It was then tightened up again for grinding.

# Sleeves for Cable Leads

By J. S. Dean
Renewal Parts Engineer Westinghouse Electric & Manufacturing Company

CONTINUALLY troubles occur in railway motors with the wiring around the frames and with the cable leads outside, due to breaking of the copper wires at the point where the insulation is cut away from the cable. It is almost impossible to remove this insulation without nicking or cutting several of the copper wires. In a comparatively short time these nicks cause the wire conductor to break at this point. Some of the schemes in common use at present and a few new ones suggested to remedy this condition are given in the accompanying illustration.




**Methods of preparing stranded cables for insertion in terminals**

No. 1—Wires twisted and soldered, no sleeve used. No. 2—Short-type sleeve connector. No. 3—Long sleeve connector placed temporarily on lead. No. 4—Final position of long sleeve connector. No. 5—Special sleeve to support insulation.

The most common method used to finish the ends of the cable leads is shown at the top. Here the strands of wire are soldered together to make a solid conductor. This provides a solid seat for the ends of the screws in the terminal and makes a better joint than if the strands of wire are left unsoldered.

The second method shows the end of the cable with a short sleeve slipped over the strands of copper and soldered in place. This is an improvement over the preceding, as it provides a better contact in the terminal and thus is less liable to heat up in service.

The next two illustrations show how a long copper sleeve can be forced underneath the insulation. The sleeve is first placed temporarily over the copper strands and then is pushed in place under the rubber insulation of the cable. This is done while the sleeve is being heated and soldered to the copper wires of the cable, which in turn softens the insulation. This type of sleeve reinforces the copper wires at the end of the insulation and transfers the strains on these wires back under the insulation on the cable, so minimizing the breakage of wires at this point.

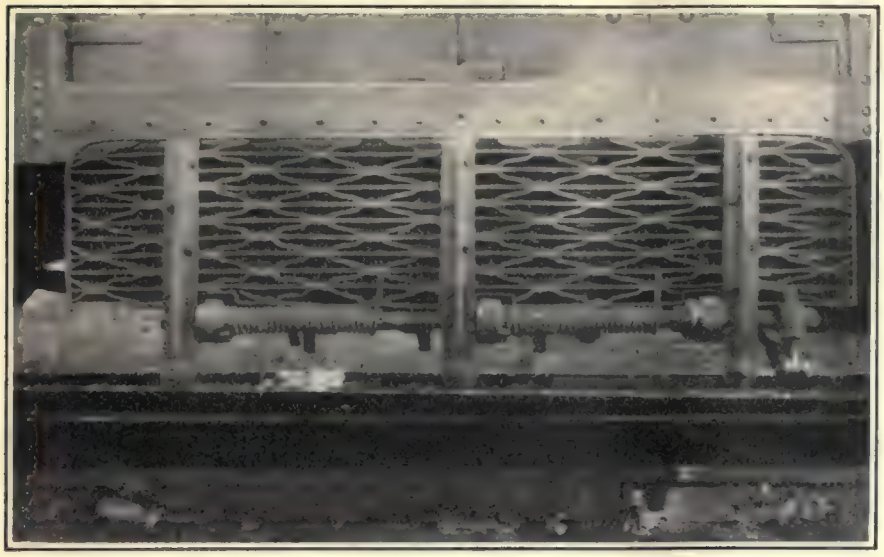
The bottom illustration shows a special type of combined terminal and sleeve which supports the insulation on the cable. This type of terminal strengthens the copper wires of the cable where they may have been damaged by cutting off the insulation. It also transfers the strain on the wires back some distance under the insulation of the cable, so as to increase the life of the connection.

*Investigate your troubles, then Invest-in-a-gate to stop them.*

## Hot Water Used for Truck Cleaning

WATER at 300 lb. pressure and at 140 deg. temperature is now used by the Market Street Railway, San Francisco, Cal., for cleaning dirty trucks. This is taken from a new high-pressure water system recently installed in the shops and makes the cleaning of dirty trucks a matter of only a few minutes.

## Metal Car Steps Reduce Maintenance



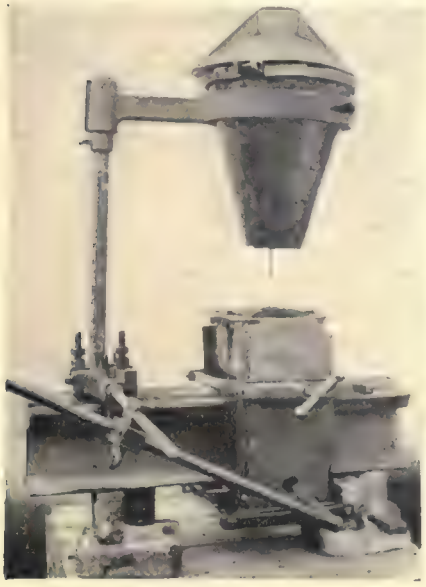
Standard metal step folded up

ONLY a few cars of the Wilkes-Barre & Hazleton Railway, Hazleton, Pa., are operating with wooden steps, as a metal step made by the Irving Iron Works has been adopted which is sanitary, self-cleaning, fireproof, non-slipping and presents a very neat appearance. Wooden step maintenance costs are usually very high due to breakage, splitting and decay. It is claimed that since the metal steps have been installed this item of maintenance costs has practically ceased.

# New Equipment Available

## Improved Thermit Nozzle Holder

COMBINATION of a crucible stand, base and nozzle holder has been made recently for thermit rail welding. This adaptation simply has used the pedestal type holder with the heavy base replaced with a simple clamping device which is clamped on the rigid crucible stand.



Crucible and preheater holder clamped to rail

This new method of holding the preheater nozzle is an improvement over the pedestal type in which the weight of the base held the nozzle in place against an occasional jar caused by a workman striking or stepping upon the hose leading from the preheater.

## Shoe Brake for Crane and Hoist Motors

WITH the purpose of meeting the demand for a shoe brake for crane and hoist motors with long life for the lining and permitting quick removal of motor armature with the brake wheel in place and without the necessity of taking the brake apart, the Electric Controller & Manufacturing Company, Cleveland, Ohio, has brought out the type WB brake. This brake has no levers or rods to pass over the top of the brake wheel. The brake shoe arms are caused to operate in opposite directions by means of a simple lever movement having the connecting links within the base below the wheel. Steel castings machined to a high degree of accuracy and oversize bearing pins are used. The brake shoe linings are of asbestos interwoven with wire and molded to shape under heavy pressure. Linings are ½ in. thick on the smallest size brake and ¾ in. thick on the largest size. This permits a large amount of wear before replacement is needed.

## Convenient Wrench Kit

CHROME-VANADIUM right-angled wrenches are a new style recently introduced by the Bonney Forge Tool Works, Allentown, Pa. These are of the double-end type, but vary from the conventional wrench in that the jaws are at right angles to the handle. The new No. 4 kit is a sample, consisting of three of the most popular sizes. The price of the complete kit is less than would be paid for the wrenches alone if bought singly.

Three wrenches in convenient case

The manufacturer guarantees that these wrenches are stronger than the bolt or nut which they fit and will strip the thread or break the bolt without damage to the wrench.

## Disinfectant for Cars

LEINOL pine is now being used by the Market Street Railway, San Francisco, Cal., to disinfect its cars daily. Leinol pine is manufactured by the John F. Leinen Sanitation Company, San Francisco, Cal., and has a pleasing pine odor. Its inoffensiveness makes it possible to apply it daily by means of a simple machine.

# American Association News

## American Executive

SEVERAL important committee reports were carefully studied nad fully discussed by the American Electric Railway executive committee at a meeting held April 1 at association headquarters in New York. Progress was reported in carrying out the plans started under the leadership of President Sawyer and Managing Director Storrs for improving the association's service to the industry and keeping abreast of changing conditions and modern transportation requirements. Those in attendance at the meeting included the following: W. H. Sawyer, president; R. P. Stevens, J. P. Barnes, J. H. Hanna, L. S. Storrs, F. R. Coates, L. E. Lippitt, C. B. Proctor, Daniel Durie, Harry Reid, C. E. Morgan, E. P. Waller, B. A. Hegeman, Jr., G. A. Richardson, T. A. Kenney, M. B. Lambert, S. J. Cotsworth, C. R. Ellicott, H. L. Brown, T. W. Casey, J. N. Shannahan, C. D. Emmons, W. R. Robertson, W. R. Power, A. E. Reynolds, R. B. Stearns, T. R. Langan, F. B. Bullock representing J. H. Alexander, H. V. Bozell, Paul E. Wilson, Edward Dana, Charles Gordon, J. W. Welsh, G. C. Hecker, J. W. Colton, Leslie Vickers, F. C. J. Dell and Labert St. Clair.

### Changes in Constitution Proposed

With the object of making the association representative of all constructive factors in the development of transportation, the committee on revision of the constitution recommended that bus companies not directly affiliated with electric railways be made eligible for membership under definitely defined conditions. This broadening of membership requirements was recommended under the following conditions:

"Company members shall consist of American companies operating any form of organized urban or interurban transportation system, or lessees or individual owners of such systems, or management or holding companies all of whose eligible subsidiary companies are company members of the association, or steam railroads having electrified sections or operating motorized equipment, and of companies, firms or individuals manufacturing or supplying materials or rendering service to such transportation companies.

"Before passing upon applications for membership of operating transportation companies, the executive committee shall cause to be published to the membership in the official publication of the association, or otherwise as the executive committee may direct, a list of such applicants under consideration together with the recommendation of the membership committee.

"Further, in the consideration of such applications as mentioned above the executive committee shall endeavor to secure in writing the advice of all operating member companies in the immediate vicinity of the applicant. Further, one of the essentials to membership shall be that, in the opinion of the executive committee, the applicant shall be fully serving or able in fact and holding itself in readiness fully to serve the transportation needs of the territory in which the applicant is operating, and/or shall be conducting its operations in line with the policies of co-ordinated transportation which the association indorses.

"Further, affirmative action of the executive committee at the time of first consideration of such application shall be only tentative; final affirmative action at a subsequent regular meeting shall be necessary before election of the applicant is effected.

"American, as here used, shall be understood to mean 'located inside the United States of America and Canada.'

"In the ordinary association procedure each company member shall be entitled to one vote, which shall be cast by its properly accredited delegate. Any accredited delegate may demand plural voting on any question, in which case each company member shall be entitled to one vote for each five hundred dollars ($500.00) or major fraction thereof, of annual dues paid to the association, with a minimum of one vote. Plural voting shall always be used in adopting standards of the engineering association. Representatives of company members shall be entitled to hold office in the association. Company members, whether operating, manufacturer or foreign, shall, in general, be entitled to all of the privileges and services of the association. The executive committee may define, from time to time, other privileges of such members and the amount of service which may be furnished and any additional charges necessary."

Other changes contemplated in the constitution were outlined by H. V. Bozell on the request of C. D. Emmons, chairman of the committee on constitution revision. The executive committee discussed the revisions as they were presented. Action was postponed until the next meeting so as to give each member an opportunity to go over the revised draft in detail.

Recommendations by the policy committee for co-ordinating the efforts of the association and other agencies working in the interest of industry development were presented in a report by Chairman R. P. Stevens, which was as follows:

"First—Your policy committee recommends that the magazine *Aera* be continued substantially in its present form, but with the advertising eliminated, cost of publication reduced, and with closer co-ordination with the technical press, to minimize duplication. Also, that the president be authorized to appoint a committee to work out such a plan, with no increase in expense to the association, and report back such plans to the executive committee.

"Second—That there should also be much closer co-ordination between our statistical department and the technical press as to securing, analyzing and publishing statistics, and that the president be authorized to appoint a subcommittee to work out a plan for such co-ordination, with no increase in expense to the association, and report back such plan to the executive committee.

"Third—Your committee recommends that no action be taken just at the present time as to the Washington office."

Discussion of the committee's recommendations brought out the fact that there has been some misunderstanding in the industry as to the purposes of the study which is being made of the association's publishing policy. Chairman Stevens pointed out that the committee's recommendations were predicated on the continuation of the association magazine in a form most useful to the industry and the association. He explained, further, that the object of the committee's recommendation was the co-ordination of the associa-

### COMING MEETINGS OF *Electric Railway and Allied Associations*

*April 13-14*—National Automobile Chamber of Commerce, meeting, Chicago, Ill.

*April 20-22*—American Society of Civil Engineers, spring meeting, Kenilworth Inn, Asheville, N. C.

*April 26-29*—Southwestern Public Service Association, convention, New Orleans, La.

*April 27-29*—American Welding Society, eighth annual meeting, Engineering Societies Building, New York City.

*May 6*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

*May 31—June 1-2*—Canadian Electric Railway Association, annual convention, Winnipeg, Man.

*June 6-8*—American Association of Engineers, annual convention, Tulsa, Okla.

*June 24-25*—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

*June 29-30*—Central Electric Railway Association, summer meeting, Book-Cadillac Hotel, Detroit, Mich.

*July 27-29*—Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.

*Oct. 3-7*—American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio.

tion's activities and that of the existing industrial press.

The executive committee passed the following motion by J. N. Shannahan regarding the policy committee's report:

"I move that the president be authorized and directed to appoint a committee of five to devise, if possible, a plan to carry out the recommendations of the policy committee."

President Sawyer, in commenting on the discussion and the action taken, stated some of the reasons for the changes in policy advocated. He said that the association's object should be to encourage rather than discourage every agency working constructively in the industry's interest.

For the committee on membership, C. R. Ellicott, chairman, reported the transfer from associate to operating membership of the Illinois Traction System, Springfield, Ill. In addition, one new associate member, five new manufacturer members and 83 individual memberships were reported. A sub-committee on special assignments has been appointed to co-operate with the membership committee, as follows: C. L. Bardo, vice-president American Brown Boveri Electric Corporation; L. C. Brown, vice-president Elwell-Parker Electric Company; B. I. Budd, president Chicago Rapid Transit Company; C. D. Cass, vice-president Waterloo, Cedar Falls & Northern Railway; A. H. Ehle, vice-president Baldwin Locomotive Works; C. D. Emmons, president the United Railways & Electric Company; C. B. Keyes, district manager railway department, General Electric Company; M. B. Lambert, transportation sales manager Westinghouse Electric & Manufacturing Company; L. H. Palmer, vice-president and general manager Fifth Avenue Coach Company; Paul Shoup, president Pacific Electric Company, and J. N. Shannahan, Old Dominion Land Company, Newport News, Va.

Harry Reid, chairman of the committee on national relations, reported the serious illness of C. L. Henry, who had charge of the work at the Washington office. On motion of Mr. Coates, the secretary was instructed to write a letter to Mr. Henry expressing the committee's regret at his illness and hoping for his speedy recovery.

Concerning the work of the sub-committee on depreciation, J. H. Hanna, chairman, said that one meeting had been held to consider the situation in the electric railway industry. A hearing on the depreciation question before the Interstate Commerce Commission is scheduled for May 22. Mr. Hanna said that a second meeting of the committee would be held in Chicago on April 6, at which time a form of questionnaire will be decided upon and the general policy to be advocated by the committee will be determined.

Regarding the Charles A. Coffin Prize, President Sawyer, speaking as chairman of the committee, said that "Electric Railway Practices, 1926" is just about completed and ready for distribution.

Mr. Vickers, economist of the association, made a brief report for the committee on taxation. He said that progress on the work of the taxation committee is being held up pending determination of the attitude to be taken by the National Electric Light Association and the American Gas Association.

Supplementing the action taken at the last executive committee meeting in Toledo, at which time the presidents or authorized representatives of state and sectional associations were made eligible to meet with the executive committee, F. R. Coates, chairman of the committee on co-operation with sectional associations, suggested that the president of the community section in the locality in which the executive committee meeting is held be invited to attend. This suggestion was adopted.

C. E. Morgan, chairman of the finance committee, read a report by the auditors regarding the association's finances. President Sawyer explained that work of the finance committee is held up to a certain extent pending final decision regarding the policy to be followed in connection with various phases of the association's activities.

### Exhibits to Open Saturday Noon

A report of the exhibit committee outlining the progress of plans for the coming convention at Cleveland was read by F. B. Bullock, representing J. H. Alexander, chairman. There were available for the inspection of the executive committee diagrams prepared by the exhibit committee and showing the space layouts for the Cleveland convention. A proposed new building to be located between the main auditorium and the west wing, just off the esplanade between the two buildings, is expected to be available for the meetings of the American and the Transportation and Traffic Associations. Space is to be provided in exhibit hall for the meetings of the Engineering, Claims and Accountants' Associations. It is expected that this arrangement will make the remaining space in exhibit hall more attractive for exhibit purposes. C. E. Morgan, vice-chairman of the exhibit committee, outlined to the executive committee some of the plans that are being made in connection with the exhibit. He called attention particularly to the recommendation that the exhibits be opened at 12 o'clock noon on Saturday, thus giving early delegates an opportunity of inspecting them before the official opening of the convention on Monday. The executive committee approved this plan, also fixing Wednesday as the day set aside for the inspection of exhibits. The convention will close on Friday noon as heretofore. The rate for inside exhibit space was fixed at 75 cents per square foot. T. W. Casey was appointed by President Sawyer as chairman of a special committee of manufacturers to represent the views of exhibitors and to form an official point of contact with the exhibit committee.

Additional hotel space to be available at Cleveland this year was listed by Paul E. Wilson, chairman of the hotels committee. The procedure followed last year of making all room assignments through this committee is to be followed again. Approval of the contract with the Cleveland convention committee was reported by T. A. Kenney, chairman of the sub-committee on contract.

Regarding the Anthony N. Brady Memorial Medal, Mr. Storrs said that circulars outlining the contest are being sent out to all electric railway companies by the Museum of Safety.

The following were appointed as delegates to the annual meeting of the U. S. Chamber of Commerce to be held in Washington May 3-5: J. N. Shannahan, national councillor; F. R. Coates, Edward Dana, W. A. Draper, C. D. Cass, E. C. Faber, W. F. Ham, R. P. Stevens, S. B. Way and F. H. Wilson.

Alternate delegates who have accepted are as follows: J. H. Hanna, substitute national councillor; H. L. Brown, H. C. Clark, S. J. Cotsworth, C. R. Ellicott, J. W. Hancock and B. A. Hegeman, Jr.

Delegates were also appointed to attend the National Conference on City Planning to be held in Washington May 9 and are as follows: J. H. Alexander, J. P. Barnes, C. D. Emmons, Thomas Fitzgerald, J. H. Hanna, A. T. Perkins, W. W. Wysor.

Presidents of sectional associations in attendance were welcomed by President Sawyer and responded by expressing their desire to co-operate heartily in the work of the American Association.

The next meeting of the committee will be held in New York on Friday, June 3.

## Rolling Stock

PROGRESS reports were made at the second meeting of the rolling stock division of the American Electric Railway Engineering Association held in Detroit, Mich., March 10 and 11. Those present at the meeting were: A. T. Clark, chairman; W. S. Adams, C. Bethel, W. C. Bolt, R. S. Bull, J. M. Bosenbury, F. J. Foote, R. W. Cost, R. A. Hutchins, M. R. Hanna, T. H. Nicholl, E. S. Sawtelle, R. B. Smyth, W. G. Stuck and H. S. Williams.

The report of the special committee on revision of manual sections contained an outline of the work accomplished so far. Decisions have been reached in regard to revision of certain dimensions of brake shoes and work is being done looking to the revision of the specification of steel axles and wheels. Information is being tabulated regarding couplers in use by various interurban railways and manufacturers will be invited to submit suggestions for revision of the test specifications.

The committee on improvements in car equipment made a skeleton outline of the work which is being covered by this committee and the committee on lighting submitted a progress report with blue prints covering various methods and tests which will be made.

The chairman of the committee on roller bearings reported that a meeting of this special committee was held March 9, at which very thorough discussion was made on the various phases of roller bearing construction. It was decided to send out a questionnaire to obtain additional information.

Special committee No. 6 on lubrication reported that a questionnaire has been sent out to various electric railway men and so far 52 per cent have answered. A test of lubrication will be made by the use of a dynamometer. Progress reports were also submitted by the committees on suction strainers

for air compressors and on motor brushes.

The chairman of the special committee on noise reduction submitted a description of the work done by this committee. It is expected that the noise measuring instruments will be used in connection with several new truck constructions which have been designed to reduce noise.

The committee on gearing is making a study of tolerances with the idea of introducing certain revisions in this specification. A questionnaire has been sent out by the special committee on current collecting devices and work on this subject is going forward. Progress reports were made by special committees on journal boxes and on limits of wear. In regard to this latter committee, it was decided that the limits of wear to be taken into consideration are axle bearing wear, axle bearing housing wear, axle wear, armature shaft wear, armature bearing housing wear and armature bearing wear.

# Humanitarian Motive Predominates in Safety Work

PREVENTION of accidents was the theme of a meeting of the Metropolitan Section, A.E.R.A., held on April 1 at the Engineering Societies Building, New York City. More members were present than at any previous meeting this season. James P. Barnes, president Louisville Railway, spoke on the safety methods used by his company and the good results obtained. The difficulties confronting this railway were brought out when he mentioned that his company operates 14,000 cars every day across steam railroad tracks at 84 different locations.

Safety work was first undertaken for economic reasons. At that time the company was spending 7½ per cent of its gross revenue for accident claims. Now this has been reduced to 4 per cent. It is not the economic side of this achievement, however, which is most gratifying to the management, but the humanitarian side.

When it was first decided to inaugurate a definite movement for the reduction of accidents, the principle was accepted that human failure is back of every accident. The first step was the organization of a safety council among the employees of the railway. Following that a challenge was issued by the men at one carhouse to the men at all other carhouses to see which group could operate during one entire month with the fewest number of accidents per 1,000 car-miles. This proposition originated with the employees but secured the immediate approval of the officials. As a result of this challenge and its acceptance it became necessary to decide upon some classification of accidents and the responsibility for them. The company adopted at that time and has since adhered to the definition that any accident which might reasonably have been prevented by the exercise of care on the part of a trainman is to be charged against him.

From this beginning the work of accident prevention has progressed into a comprehensive and continuing program which covers the entire property. At the start one accident occurred for every 1,800 car-miles operated. It was decided that this must be cut down to one-tenth of that figure. The goal was reached in January, 1927, when the company had only one accident for every 19,000 car-miles operated. The high record for a single month last year was one per 76,000 car-miles.

Together with other organizations interested in accident prevention work, the Louisville Railway some time ago sponsored the organization of a Life Savers' Club among the drivers of commercial vehicles. Any one who has operated a commercial vehicle in the streets for an entire year without being involved in a single accident is eligible for membership. At the present time there are 219 railway motormen among the members.

In conclusion, Mr. Barnes emphasized the changed conception of safety work, saying that the program which was undertaken as an economic measure had ended by becoming a humanitarian movement. Nothing does more, he said, to create a bond between the officials and the men than their common interest in safety work.

James J. Duffy, supervisor of the school of instruction Brooklyn-Manhattan Transit Corporation and Brooklyn City Railroad, outlined the accident prevention work of those companies. He explained the bonus plan that has been in effect for the past eight months and said that the total number of accidents had been reduced from 9,518 for a corresponding period the year before to 8,275 under the new plan.

Chester Briggs, a motorman of the New York Railways, spoke on the care necessary in the operation of cars on Broadway, New York City. He emphasized the point that accidents do not "just happen" but are caused by negligence. During the past fifteen months accidents have been reduced 14 per cent on the Third Avenue Railway System, according to William E. Foley, director of claims. Harry C. White, supervisor of industrial relations Edison Lamp Works of the General Electric Company, said that safety is largely a matter of salesmanship by executives. Anything can be accomplished if a sufficiently determined effort is made. He told of certain experiences he had had with Charles P. Steinmetz and stressed the success attained by this great genius in overcoming almost insuperable obstacles.

Before the commencement of the regular program, T. R. Langan, president of the section, introduced W. H. Sawyer, president American Electric Railway Association, and Daniel Durie, president American Electric Railway Engineering Association. Mr. Sawyer told the members that the job before them today is too big to permit telling of hard luck stories. Too much is at hand waiting to be done to waste time in that manner. The complexity of transportation problems today, he said, creates an unprecedented opportunity for the men in the industry.

## Brady Safety Medals Again Offered

FOR the first time in ten years the Anthony N. Brady medals are being offered. At the request of the American Electric Railway Association the contest is being conducted by the American Museum of Safety, with headquarters at 130 East Fifteenth Street, New York City. The next award is to be for the year ended Dec. 31, 1926.

A committee on the award has been appointed, consisting of Lewis Gawtry, president the Bank for Savings, chairman; Col. A. B. Barber, James H. McGraw and Lucius S. Storrs. A committee to determine the conditions of the competition has also been named, consisting of Thomas Fitzgerald, vice-president Pittsburgh Railways, chairman; H. K. Bennett and C. H. Evenson. The plan of award has been somewhat modified. There are to be three medals, as formerly, but each to be given as a first prize to railway organizations, as follows: Gold medal, for electric railways operating more than 5,000,000 vehicle-miles; silver medal, for those operating more than 1,000,000 but not over 5,000,000 vehicle-miles; bronze medal, for those operating less than 1,000,000 vehicle-miles. The committee of award may also, in its discretion, make honorable mention of one or more electric railway organizations, based on the same criteria as the award of the medals, or any other factors that may appeal to it as especially worthy of commendation.

The conditions of the award are, in brief, as follows: Every competing company shall include data covering all its electric railway and bus operations without regard to technical ownership. Presentations should cover broadly and as completely as possible all of the factors prescribed. A definite rating will be assigned by the committee to each of these and a grading will be assigned to each company's presentation based upon the relative accomplishments under each heading.

The factors are: (1) The success in gaining good will as indicated by the initiative, skill and enterprise manifested in improved safety conditions; (2) the improved safety conditions that have resulted from original ideas, as well as the extent to which the company has taken advantage of new development of safety in operating and maintenance practice and equipment originating with others; (3) improvements in safety practice that have resulted in reduced maintenance, or greater reliability of service; (4) particular success in conducting a safety program and actually reducing the number and seriousness of accidents; (5) outstanding accomplishments in development of co-operation between management and employees in safety promotion; (6) outstanding accomplishment in measures to promote sanitation and health. All presentations must be in the hands of the American Museum of Safety on or before Aug. 1, 1927. Details may be obtained from the American Electric Railway Association.

# The News of the Industry

## Enabling Legislation in Philadelphia

A bill has been introduced in the Pennsylvania Senate to empower the city of Philadelphia to take over the Philadelphia Rapid Transit Company's underlying properties under condemnation proceedings, but requiring a vote of the people. The measure has the approval of Charles S. McChord, utility expert engaged to investigate the transit situation by the Public Service Commission. The proposed new legislation is considered necessary. The bill would permit the city to acquire the underlying companies without taking over the Philadelphia Rapid Transit Company, whereas under the existing Hecht law it is said both the franchise holding companies and operating company would have to be taken over under condemnation proceedings.

The recommendations contained in the McChord report were the subject of a brief review in the ELECTRIC RAILWAY JOURNAL for March 26, page 584.

## Another Coffin Contest Announced —Grand Rapids

Plans are being made by Vice-President and General Manager DeLamarter to have the Grand Rapids Railway, Grand Rapids, Mich., enter the contest for the Charles A. Coffin award for 1927. In its house organ, the *Token*, for March, the company says in part:

All of which means that from now until July 15 the Grand Rapids Railway must be one of the best, if not the best, in the United States. Many visitors will be inspecting the property, riding the new coaches to determine their superiority over the old style cars, and also to get first-hand information on the kind of service and courtesy we are giving the public. In fact, it means that all of us must be on our best behavior and give the best service possible to prove our brief.

In trying for this award there must be co-ordinated effort. Each of us must give the best in us to improve the service. By pulling together employees of the Grand Rapids Railway can prove that all of the good things broadcast about us are in everyday practice on our system. And the reward may be establishing our company as the best of its size of any in the United States.

Let's go out and win it!

## Baltimore Line Takes Advantage of Gas Rebate

The United Railways & Electric Company, Baltimore, Md., will take advantage of a rebate of 1 cent per gallon on the state gasoline tax which became effective on April 1. Two new laws passed by the Maryland General Assembly add 2 cents to the former 2-cent gasoline tax. Of the increase 1½ cents is for lateral roads in the state and the other ½ cent is to help defray the expense in eliminating grade crossings.

A provision in the law creating the lateral road tax enables the owners of buses, trucks and other vehicles used entirely within the limits of incorporated cities and towns to receive a rebate of 1 cent per gallon on gasoline used by such vehicles. The United Railways & Electric Company operates 50 passenger buses within the limits of Baltimore.

## Home Rule Defeated in Chicago

Sight of the local railway problem was largely lost in Chicago's bitterest mayoralty campaign, which ended on April 4. Candidates of both major parties soft-pedaled the issue, but the vote of less than 60,000 for John Robertson, independent candidate, indicates public ownership and 5-cent fare talk was not taken seriously. William Hale Thompson, successful candidate, polled 41,000 more votes than his opponents combined.

The present Mayor, William E. Dever, stood on his record of efforts to win home rule and unify local transportation under a new franchise. Mr. Thompson offered stereotyped promises of a fair deal to all. In his previous administration he sought to cut 8-cent car fares to 5 and in his effort at a political come-back charged that the 1925 city purchase referendum and the present franchise negotiations were evidence of Mr. Dever's subservience to traction interests. Mr. Dever accused Mr. Thompson of displaying favoritism to Mr. Insull by attempting to block the city's fight to lower gas and electric rates and by squelching opposition to the State Commerce Commission's order increasing elevated fares to 10 cents in 1920. Mr. Dever pointed pridefully to his fight on the Barr terminal permit bill and his strong advocacy of the Durso bill, now pending, which would create a local utility commission.

Mr. Robertson flooded the city with sensational literature denouncing New York banker control of the surface line companies and insinuated that the companies had contributed to the campaign of his opponents. He pledged himself to stand by the straphanger and bring about a public ownership referendum.

With the election over it is hoped the City Council will resume consideration of the plans for a franchise settlement, dropped last February. The ray of hope here is not brilliant, for many of the Aldermen seem to be confused by the complexities of the franchise task and a second temporary extension of the franchise of the Surface Lines may be necessary.

Only 15.000 votes stood in the way of adoption of a home rule amendment voted on in Chicago an April 5 on the petition of 260.000 citizens. This amendment would have taken control of all local uti'ities from the hands of the Illinois Commerce Commission and vested it either directly in the Chicago City Council or in a local commission created by the Council. The measure was fashioned after the state public utilities act and would have taken effect almost immediately.

## Paving Relief Bill Defeated in Detroit

The proposed charter amendment designed to relieve the Detroit Department of Street Railways, Detroit, Mich., from the cost and responsibility of paving between the tracks was defeated by an overwhelming majority of the 60,000 voters who went to the polls on April 4. Early returns indicated that the proposition was defeated in at least 75 per cent of the city precincts. The proposed amendment was sponsored by Mayor Smith and the Street Railway Commission.

It was pointed out that the cost of paving between car tracks amounted to between $600,000 and $700,000 annually. The charter amendment as it appeared on the ballot also provided for removing the cost of repaving and watering between the tracks. The measure fixed a rate of fare on the municipal system sufficient to pay:

(a) Operating and maintenance expense exclusive of paving, repaving and watering between tracks.

(b) Taxes on the physical property of the entire railway system the same as though privately owned.

(c) Fixed charges.

(d) A sufficient per cent per annum to provide a sinking fund to pay the principal of the mortgage bonds issued, at their maturity, and such other additional per cent per annum to provide, in the sound discretion of the board, a sinking fund to pay the principle of the general bonds issued as soon as practicable, to the end that the entire cost of the railway shall be paid eventually out of the earnings thereof.

## Boston & Worcester Decision in May

The petition of Receiver Miller of the Boston & Worcester Street Railway, Framingham, Mass., in which he seeks to gain authority to operate buses instead of trolleys as he sees fit, was heard a second time before the Supreme Court recently. Representatives of the bondholders of the railway who are seeking to reorganize the road were successful in securing a postponement of the decision in the matter until May 3.

At the hearing it was stated that actual steps in the reorganization proceedings had taken place. The Boston & Worcester Street Railway has bonds outstanding to the amount of $2,460,000, while the Framingham, Southboro & Marlboro line, which is controlled by the Boston & Worcester, has bonds outstanding to the amount of $60,000.

The Boston & Worcester Street Railway reorganization plan proposes formation of a new company to have $252,000 first mortgage 20-year 7 per cent bonds, $756,000 reorganization bonds to be secured by second mortgage,

$756,000 of 6 per cent preferred stock and $1,388,000 common stock. Each depositor, whether a subscriber for first mortgage bonds or not, will receive for each $1,000 bond, plus any accrued interest, $300 face amount of reorganization bonds, $300 par value of preferred stock and $400 par value of common.

## Cincinnati's Community Chest Subsidized by Railway

A gold mine of good will was discovered by Hudson Biery, Director of Public Relations of the Cincinnati Street Railway, Cincinnati, Ohio, in the small fare announcement board in the front of the street cars when he converted it into a medium for advertising Cincinnati's social agencies. This board which had established itself in people's minds as the place to find notices of increase in fares, was performing no present service. No change in fares had taken place for more than a year.

Under the heading "Do You Know," a 25-word message is carried in this space for each of Cincinnati's humanitarian enterprises, each one appearing for half a week in all cars. This series of advertisements will last more than a year.

The service-at-cost franchise, under which this system operates, does not permit a cash donation and the advertising, donated to the ninety-two members of the Community Chest, is directed to tell the public what each group is really accomplishing.

A typical message is as follows:

Do You Know?

The Salvation Army gave 208,137 meals, supplied 73,854 beds and gave garments, shoes and medical aid to 7,856 in 1926. Individuals helped, 56,045. Aided by the Community Chest.

A small trade mark of the railway appears in the lower right-hand corner as it was the only way of showing that the company was donating the space.

The *Times-Star*, the *Post*, the *Enquirer* and the *Commercial-Tribune* are co-operating by carrying each new message as it appears in the cars.

## 1928 Calendar Announced by Safety Council

While the present time seems early for 1928 calendars, the National Safety Council has adopted a new policy by producing its calendars ten months in advance in order that its member companies may obtain a supply early.

The calendar is the most artistic ever put out by the National Safety Council. A picture for each month carries a special safety message appropriate to the season. The pictures are by well-known artists and are excellently reproduced. On the reverse side of each sheet is a safety message.

A schedule of prices has been worked out, the price depending on the quantity. Discounts are allowed for early orders and shipment, being greatest at present and reducing monthly until July 1. As is customary, there is a space on the face of the calendar in which the name of the company distributing it may be inserted.

Those desiring further information should communicate with W. H. Cameron, managing director, 108 East Ohio Street, Chicago, Ill.

## Corporation Counsel Says Chicago May Bar Downtown Parking

Citing numerous court decisions in which the authority of cities to prohibit the obstruction of the streets by parking has been repeatedly upheld, the law department of the city of Chicago recently presented an opinion on this question to Mayor William E. Dever. A special committee on downtown parking appointed by the Mayor early in January following publication of the $50,000 traffic survey by the Chicago Association of Commerce has had the subject under consideration for several months, but as yet no meetings have been held or other action taken.

It was to ascertain what can be done to restrict parking in Chicago's congested business streets that the opinion was prepared. According to Corporation Counsel Francis X. Busch, who approved the document, "the city council has the legislative power, both in principle and authority, to enact ordinances for restricting in proper cases the use of the streets for parking, standing and storage purposes, where the same is deemed by the Council to impair the use of the streets for the passage and travel of the public, or to interfere with the ingress and egress of abutting property."

Though all such ordinances are subject to judicial review and condemnation when plainly arbitrary or unreasonable, Mr. Busch points out, they must be presumed reasonable and valid until proved to be otherwise, and should therefore be enforced by the administrative and executive officers of the city.

The parking of cars, except for the loading and unloading of persons or goods, is storage and standing, in the opinion of the corporation counsel's office. "Such standing or parking of vehicles upon the streets amounts to the use of the streets for the purpose of storage and not for the purpose of travel," Mr. Busch declared. "It makes no difference whether such periods of storage use continue for a few minutes only or for much longer periods. The character of the use of the streets will not be different whether such vehicles be left unattended or left in charge of a driver or other caretaker awaiting the return of an owner or occupant having general control and direction over the vehicle, nor will the character of that use be changed whether the person so parking shall be the owner or occupant of property abutting on the street, or any other member of the general public."

Among the various authorities quoted by the city attorney was the Illinois Supreme Court.

## Legislative Results in New York Considered Disappointing

The day of legislative reckoning in New York State was concluded with Governor Smith's "Finis" on April 7. Some constructive work was done. But the opinion seems to prevail at Albany that the session just closed will go down in history mostly for what it did not accomplish rather than for what it did do. As an instance, all of the gasoline tax bills failed of passage. A measure drawn just before the adjournment of the Legislature imposing a tax of 1 cent a gallon which it was proposed to introduce on the closing day of the session was abandoned by the legislative leaders.

Compulsory motor vehicle insurance for all cars also met with disapproval of the legislative leaders. The bill transferring the provisions of the highway law, in relation to motor vehicles to the tax law, passed by the Legislature, was withdrawn from the Governor due principally to the fact that so many amendments were offered to the highway law which had been passed that to have re-enacted the provisions of the law into a new law might have left a situation whereby the state would have been without any motor vehicle law at all until the Legislature could meet and correct the situation.

Some bills that have become law follow:

Chapter 278 the Bartholomew bill, Assembly print No. 1,456, amending highway law in relation to deposit with commissioner of motor vehicles of number plates of uninsured car.

Chapter 296 the Bartholomew bill, Assembly print No. 1,099, amending highway law in relation to operation of motor vehicle while license is suspended or revoked.

Chapter 271 the Bartholomew bill, Assembly print No. 1,093, amending highway law in relation to motor vehicles carrying passengers for hire.

Chapter 272 the Bartholomew bill, Assembly print No. 1,097, amending the highway law in relation to keeping clean number plates on motor vehicles.

Chapter 274 the Bartholomew bill, Assembly print No. 1,091, amending the highway law in relation to registration fees for trailers.

The Pammenter bill, Assembly print No. 947, as chapter 152, amending the town law authorizing appropriations by the town board for the purchase and maintenance of traffic signals.

## Track Space Being Sought for October Convention

Following on the heels of the application of J. R. Blackhall of the Chicago & Joliet Electric Railway for track space to show one of his new cars at the October convention of the American Electric Railway Association, Thomas Conway, Jr., president of the Cincinnati, Hamilton & Dayton Railway, has advised Fred Dell, director of exhibits, that he will also want track space upon which to show at least one or perhaps two of his new cars if traffic conditions permit of the withdrawal of two from service at that time. These care are low-level, high-speed interurbans, designed and equipped for train operation.

By no means does this exhaust the good news. Mr. Dell has also received a letter from H. B. Potter, general manager of the United Railways & Electric Company, Baltimore, making application for track on which he intends again to exhibit one of his articulated cars this year. In addition, and owing to the recent research and development work which the United Railways has been conducting, Mr. Potter has indicated he intends to have inside booth space in which he will show some very interesting models of rheostatic car heaters, automatic slack adjusters, articulated car parts, etc.

These requests for track space at this early date, six months prior to the convention, indicate that the track exhibit will surpass the magnificent showing of 41 car units at Cleveland last year.

## Foshay Company Announces the Judges in Advertising Contest

Judges who will decide upon the prize winners in the $5,000 advertising contest of W. B. Foshay Company are B. C. Forbes of *Forbes Magazine;* Col. W. N. Wamsley, manager financial bureau New York *Times;* Edson B. Smith, financial editor Boston *Herald-Traveler;* Harper E. Leech, feature financial writer Chicago *Tribune;* E. C. Hillweg, assistant publisher Minneapolis *Tribune;* Carl W. Jones, general manager Minneapolis *Journal*, and Wilbur B. Foshay, president W. B. Foshay Company.

As announced previously in the ELECTRIC RAILWAY JOURNAL the W. B. Foshay Company, public utility operators, started a contest on Nov. 1, 1926, for the submission of either a series of newspaper advertisements or some other form of advertising such as a folder, single booklet, slogan or other form advertising the W. B. Foshay Company's system of controlling and managing public utilities and selling the securities of these companies. The contest, an open one, closes on April 30 and the prizes will be awarded on June 1, 1927. All advertising material is to be sent to contest editor, W. B. Foshay Company, Foshay Building, 826 Second Avenue, South, Minneapolis, Minn.

## Chicago Surface Lines Awards Prizes for Accident Prevention

For the best record in accident prevention of any division of the Chicago Surface Lines during 1926 motormen and conductors at the North Avenue station were awarded first prize at the annual safety dinner of the company in the Congress Hotel, Chicago, on March 3. The award was made by Guy A. Richardson, vice-president, and the large plaque given as first prize was accepted by William Pasche, division superintendent. The second prize, an artistic shield, was won by the Lincoln Avenue division.

The contest, engaged in by all of the twelve divisions of the system, began a year ago and was concluded on March 1. About 500 employees of the company attended the dinner. Among them were the oldest trainmen from the winning divisions, some of whom have been in service for from 25 to 40 years. A new contest was begun to continue throughout the current year.

## New Oneida Fares Approved

The city of Oneida, N. Y., having withdrawn its objection to proposed fares on the Oneida line of the New York State Railways, the Public Service Commission on April 1 approved of the following fares on and after May 1:

Between any two points in Oneida, 10 cents.

Between any two points in Sherrill, 10 cents.

Between Oneida and Sherrill and points intermediate thereto, 10 cents.

Between Oneida and Wampsville and points intermediate thereto, 10 cents.

Between Wampsville and Oneida Castle and points intermediate thereto, 10 cents.

Between Sherrill and Oneida Castle and points intermediate thereto, 10 cents.

With the privilege of purchasing three tickets for 25 cents, each to be good between any of the two points named where the fare is 10 cents.

For single trip rides between Oneida and Kenwood, 10 cents.

Fifteen cents per ticket for round trips good between Oneida and Kenwood.

Fifteen cents per ticket for round-trip tickets good between Oneida and Wampsville, but such round-trip tickets to be good only on interurban local cars.

A 30-day 50-trip commutation book for $2.50 between Oneida and Sherrill and also between Oneida and Wampsville, and to cancel the 46-trip school ticket between said points, now sold for $2.75.

Petition for increased fares was filed by the company on April 9, 1926, and hearings held before Commissioners Lunn and Van Voorhis on July 12, 1926, and March 25, 1927. Decision was withheld pending hearings on similar applications filed by the company for increased fares in Rome, Utica and Syracuse. At the hearing on March 25, 1927, the city was represented by Charles R. Coville, city attorney, and at his request the company made certain changes in its proposed schedule. Later the city withdrew its opposition.

## Celebrate Twenty-five Years of Service in Salt Lake City

An organization known as the "Quarter Century Club" has been formed by veteran employees of the Utah Light & Traction Company, Salt Lake City, Utah. Every employee with a continuous service record of 25 years or more is eligible to membership, regardless of the department in which he may be employed. Thirty-four members are now enrolled.

The organization of the club was featured by a dinner on the evening of Jan. 28, at which the members were guests of the management. George W. Manning, traffic superintendent of the company, was elected president of the club. G. A. Partridge was chosen vice-president and Miss Flora Manning secretary.

## Tax Commissioner Renews His Plea for Relief

Electric railways should be absolved from paying costs of paving between car tracks and 2 ft. outside. So said State Tax Commissioner John Merrill on March 9 at the winter meeting of the State Conference of Mayors.

Mr. Merrill spoke somewhat along the lines of his recent utterance in New York, reviewed in the ELECTRIC RAILWAY JOURNAL for Feb. 5, page 260.

## Awards to North Shore Employees for 1926 Business Tips

More than 500 employees of the Chicago, North Shore & Milwaukee Railroad gathered at the Hotel Sherman in Chicago recently to celebrate with a dinner and appropriate speech-making the successful completion of the company's Better Business Campaign conducted during 1926.

This event was unusual in the annals of the electric railway industry inasmuch as the North Shore line is believed to be the first transportation organization to enlist its employees in an organized effort to obtain new business. Those present included the individual prize winners, members of the leading teams and their wives and friends.

At the time the campaign was started in January, 1926, the North Shore line management offered $5,000 prize money for those individuals and teams making the best record in securing new passenger and freight business during the year. In the course of the drive a total of 7,714 tips were turned in to the traffic department by 647 employees. Cash prizes ranging from $250 to $10 were awarded 76 employees at the big banquet, which was the award for the leading teams.

The entire North Shore line personnel was organized into teams and each team was assigned a quota of new business each month. The excellent results attained are shown by the fact that the highest team averaged 430 per cent of its quota for the year.

Recent expansion of the company's facilities, including service over the new $10,000,000 Skokie Valley route, purchase of electric refrigerator cars and flat car-trailer equipment, 20 new passenger cars and three new diners and construction of new passenger stations and a $125,000 garage, was the incentive for the increased traffic drive.

As a result of the success attending the first campaign and the splendid effect upon employee morale another drive has been launched for the present year and is already witnessing the establishment of new high records.

A similar campaign of traffic solicitation by employees of all departments was initiated last month by the Chicago, South Shore & South Bend Railroad under the active leadership of Charles H. Jones, general manager.

Salt Lake City company honors veterans

## Increased Wage Sought in New York State

A straight increase of 9 cents an hour for employees of the New York State Railways in Rochester, Syracuse and Utica, N. Y., is demanded by the union in the first negotiations for a new wage and working agreement for the year starting May 1. The demands of the employees, as framed by a joint board of union executives, were read at a meeting of the men in Rochester on April 1. In replying to the demand, James F. Hamilton, president of the railways, said that the increased cost of improvements in the three cities will prevent the granting of the pay boost at this time. Chief among the increased expenses was cited the mounting cost of paving improvements.

The union contends that the recent fare increases in the three cities justify an increase in wages. In Rochester the fare was raised from 7 to 8 cents on Jan. 1, 1925; in Syracuse and Utica the fare has been increased to 10 cents within the past few months.

The present scale for motormen and conductors in cents per hour on two-man cars is 55 cents, on affiliated interurban lines 57 cents and for operators of one-man cars 60 cents.

Further negotiations are under way, with a conference between railway and union officials scheduled for April 20. The contract calls for arbitration.

## Rapid Transit Measure for St. Louis Is Dead

The rapid transit enabling act for St. Louis, Mo., died with the Missouri General Assembly on April 2. Major C. E. Smith, consulting engineer for the city, has stated that if the bill was not passed it was virtually useless to talk of constructive steps toward building a rapid transit system for St. Louis until the next meeting of the Legislature in January, 1929. The rapid transit system contemplated would cost upward of $100,000,000.

Under the bill as originally drawn the people of the city were empowered to decide at the polls the way in which they desired to pay for a rapid transit system. As amended the bill requires financing looking toward higher fares.

Downtown property owners were the principal objectors. They claimed that the measure as drawn would have given the Board of Aldermen unlimited authority to assess special benefits against property for the payment of the subway. These property owners want 40 per cent or less assessed against downtown property, the city at large to pay the balance of the estimated $200,000 needed to build a complete rapid transit system.

## P.R.T. Consolidates Its Business and Executive Offices

The Philadelphia Rapid Transit Company, Philadelphia, Pa., has leased more than half of the floor space in the new Equitable Building, located at the corner of Broad and Locust Streets. Twelve office floors will house the office forces of the parent company and of its various subsidiaries, while the mezzanine floor will be converted into a bus ticket office and waiting room. In addition Mitten Management has leased the entire twentieth floor for its executive offices. Heretofore the executive offices of P.R.T. and of Mitten Management have been located at 1520 Spruce Street, while the general business offices were at Eighth and Dauphin Streets. Other offices were located in the Land Title Building, the Liberty Building and the *Bulletin* Building. It is understood that all of these are to be relinquished at the time the move to the new location is effected.

Under the new arrangement all officials of the companies will have their offices in the Equitable Building, save for the actual operating supervisors. The transfer to the new building will be made during the current year. The company believes that considerable economies can be effected through the centralization of general and executive office functions.

## Louisville Award Presented

The Anthony F. Connelly award for 1926 was presented to Lewis Elmore, motorman, Fourth Avenue carhouse, at the February safety dinner held in Safety Hall of the Louisville Railway, Louisville, Ky., on March 15. Mr. Elmore was selected from among some 50 men of the company as the employee qualified to receive the designation "best public servant." James P. Barnes, president, presented to Mr. Elmore the Connelly award, consisting of the Gold Award Medal, $75 in gold and an invitation to be the guest of the company at the annual convention of the American Electric Railway Association to be held at Cleveland next October. Mr. Elmore has been employed by the company for the past eight years.

## Transfers Simplified in Houston

A simplified form of transfer will hereafter be used on the street cars and buses of the Houston Electric Company, Houston, Tex. Carl B. Frazier, superintendent of traffic, says the new transfer has the names of the street car and bus lines grouped into six divisions, exclusive of South End, Kensington, shuttle and car to car changes. Under the new plan the operator will punch the name of the car line upon which the transfer is issued and it will be good on any of the other lines in the city except those named in the same group as the line from which it is issued. It will be good on cars in the same group as the line from which it is issued at the first point of intersection.

Operators will have only to punch the name of the line on which they are working, the time, and if inbound or outbound. Under the old system they punched the line to which the passenger wished to transfer, the line from which the transfer was issued, the date and the time. Each transfer had to be punched as it was called for. Under the new plan the operator can punch a number of transfers at the end of his line sufficient to last him on his inbound trip, and on the outbound trips all he will have to punch is the designation that the transfer was issued while the car was operating outbound.

## New Disposition for Lost Articles in Atlanta

A new method of disposing of unclaimed articles found originally on its cars has been adopted by the Georgia Power Company, Atlanta, Ga. The wives, mothers and daughters of the employees are organized into a women's auxiliary, which is again divided into six groups. Each month unclaimed articles are turned over to one of the women's auxiliary circles, which holds an "old hoss" sale. The money thus secured is placed in a special fund for charitable purposes giving the organization a definite and considerable sum for welfare work.

The company found that the old method of keeping the articles for 30 days at the office of the starter resulted in an accumulation of stock which every month or two had to be given over to the Salvation Army or some other organization. Although the honest trainman frequently became the unexpected owner of an unbrella for himself or a bag for his wife, it is said he, too, lost interest in the arrangement.

# News Notes

**Seek Wage Increase.**—Employees of the Sioux City Traction Company, Sioux City, Iowa, members of the Amalgamated Association, are asking a 10 per cent increase in their wage scale, which expired March 1. The scale is now 56 cents an hour maximum down to 51 cents. The company recently increased its fare from 7 cents to 8 cents. One-man cars are used exclusively.

**Franchise Law in Missouri Killed.**—The proposed perpetual franchise law for Missouri died with the General Assembly on April 4, being on the calendar of the Senate when the final adjournment was taken. The bill had been reported favorably by the Senate judiciary committee, but amended so as not to apply to St. Louis or Kansas City. Public utilities of the state had favored the measure, which was also supported by the Missouri utilities, including the North American Company, the Studebaker organization and many others.

**Hearing in Council Bluffs on April 11.**—Hearing in the fare case of the Omaha & Council Bluffs Street Railway, Council Bluffs, Iowa, has been adjoined until April 11, giving the city time in which to prepare its side of the case. Four weeks time has been consumed in presenting the railway testimony before Special Master Claude R. Porter in Council Bluffs. The value of the property used in giving service is to be determined and also the rate of return. Then a fare rate will be decided.

**Madison Tries Free Ride.**—The Madison Railways, Madison, Wis., in conjunction with the city's leading department store, has solved the problem for the store of increasing the number of shoppers during the quiet morning hours. This difficulty was successfully overcome when the store leased the railway system between the hours of 9

and 12 a.m. on March 29. Approximately 2,000 persons were carried free by the company's cars during these three hours. Store officials declared the success of the plan fully merited the expense involved.

**Council Approves Rate Increase.**—An ordinance raising rates on the Iowa Southern Utilities Company in Burlington, Iowa, from 7 cents to 10 cents for cash fares and the purchase of tickets in blocks of three for 25 cents has been passed by the City Council.

**Upholds Paving Order.**—The Appellate Division of the Supreme Court at Albany, N. Y., has upheld the order of the State Public Service Commission directing the International Railway, Buffalo, to pave a 2-ft. strip along its tracks in Walden Avenue and in Grant Street and to reconstruct its roadbed in these two streets. The International appealed from the order of the commission, issued in December, 1925.

**Applies for Fare Increase.**—The Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., has applied to the Missouri Public Service Commission for an increase in rates from 2½ cents to 3 cents per mile effective on May 1. This company operates an interurban between Kansas City and St. Joseph, a distance of 50 miles, and a branch between North Kansas City and Excelsior Springs, a distance of 32 miles. If increased fares are not granted officials of the company state it will not be possible to pay even interest on the outstanding bonds. The estimated receipts for 1927 are $759,279 under the 2½-cent fare and $843,615 under a 3-cent fare. The former figure would fall short by $14,000 of paying interest on bonds.

**Ten Cents in Macon.**—A 10-cent fare with the privilege of selling four tickets for 30 cents was allowed the Macon Railway & Light Company, Macon, Ga., by a recent decision of the City Council. The old fare was 7 cents. The company was also relieved from paying further paving assessments and permitted a complete change in the routing of its cars so that practically all will have terminals in the downtown district instead of operating from one side of the city to the other. The request in the petition, filed by the company on March 15, looking toward relief of a gross income tax, now amounting to 2 per cent, was denied.

**Rebate Slips for Dilatory Coin Dropper.**—Because of numerous complaints from passengers who inadvertently or accidentally drop more change than is necessary in the Johnson fare boxes, the Southern Colorado Power Company, Pueblo, Col., is using a rebate slip. Inasmuch as one of the mottoes of the Byllesby organization is "Never forget that your company is a public servant that wants no dollar it does not fairly earn," a system has been devised wherein the operator punches the amount of overpayment, which is collectible by the bearer at the company's offices. Heretofore there has been no practicable way in which the operator could repay the customer as he was charged with all coins registered. The new system protects the operator and avoids ill feeling on the part of the customer.

# Recent Bus Developments

## Bus Regulatory Measure Before Missouri Governor

The Missouri Senate has passed the amended House bill providing for the regulation of bus lines in the state. The measure is now before Governor Baker, who has stated he will sign it.

The bill places the People's Motorbus Company, St. Louis Bus Company and other lines of the United Railways, St. Louis, under the control of the Missouri Public Service Commission, but the strictly city lines will not be compelled to pay the special bus taxes, nor is the city deprived of the right to control the use of its streets and regulate the use of buses operating within the corporate limits. However, if a St. Louis bus company sought to extend or change its routes it would be compelled to obtain a certificate of convenience and necessity from the Public Service Commission. That body is also given jurisdiction over the fares to be charged by bus companies.

The bill also provides that the Public Service Commission in considering applications for certificates of convenience and necessity for a bus company to operate or extend its lines shall take into account the transportation service being furnished by any railroad, street railway or motor carrier and shall pass upon the likelihood of the proposed service being permanent and continuous.

## Oil-Electric Bus Developed in Philadelphia

Experiments in the use of fuel oil in driving gasoline-electric buses are being carried on by Mitten Management in Philadelphia, according to a recent announcement. Apparatus has been devised by which the changeover can be made at an approximate cost of $50 per bus, it is said.

Double-deck bus No. 300 of the Philadelphia Rural Transit Company has been operating on a regular city route for several months equipped with the fuel-oil apparatus. It has run more than 15,000 miles and its mileage per gallon of fuel oil is reported to be slightly in excess of the average miles per gallon of gasoline. The official statement declares that the use of fuel oil will not only effect a substantial saving, due to the fact that its cost per gallon is about one-half that of gasoline, but that it will provide a greater factor of safety because oil is less inflammable than gasoline.

In a report to T. E. Mitten on the subject, J. A. Queeney, vice-president of Mitten Management, under whose direction the fuel oil feature has been developed, had this to say:

> The work has now progressed to the point where we feel confident that our gasoline-electric buses can be successfully operated with fuel oil. The first bus so equipped—a double-deck—is now in regular daily service on Broad Street and up to date has made approximately 15,000 miles. Its general performance is satisfactory.
>
> The engine of the oil-electric bus is started with gasoline and thereafter operates on fuel oil. The change from oil to gasoline is made automatically, no action by the driver being necessary.
>
> While I am not yet ready to recommend that the engines of all our motor buses be arranged for operation with fuel oil, as we still have a number of refinements to make, nevertheless sufficient progress has been made to demonstrate to our satisfaction that it is thoroughly practical to operate on fuel oil, and this work will be carried forward as rapidly as possible.

## Blue Goose and Purple Swan End Hostilities

The Purple Swan Safety Coach Lines discontinued its St. Louis to Alton, Ill., service on April 1, abandoning the field to the East St. Louis & Suburban Railway and its subsidiary bus line, the Blue Goose line. To the same railway and bus properties it had previously given a monopoly of the trade between St. Louis and Belleville.

The Purple Swan company opened service between St. Louis and Alton on Aug. 1, fixing its rates at 75 cents for one way and $1.25 for the round trip. The electric railway at that time was charging $1.86 for the round trip. When the competition began to cut heavily into the receipts of the car lines the Blue Goose bus line entered the field as an auxiliary to the street cars. At the same time the round-trip rate on the electric line was slashed to $1, while the service was greatly speeded up.

Following the abandonment of the Purple Swan line from St. Louis to Belleville, the East St. Louis & Suburban Railway on March 27 put into effect a new schedule of street car and bus fares between these two cities. The rates are practically the same as were charged prior to the competition of the Purple Swan line with the Blue Goose Bus Line, operated by the railway. The new rates are: Street cars, 39 cents one way and 60 cents round trip on date of sale and 70 cents for round trip with fifteen-day limit. The bus fare is a flat 45 cents for one way.

**Buses Will Supply Service.**—Discontinuance within the next 60 days of the interurban line which the Wisconsin Public Service Corporation has been operating at a loss for many years between Two Rivers and Manitowoc was agreed upon at a joint meeting of railway officials and representatives of the two city governments held at Two Rivers on March 24. Four new interurban buses of 25 passenger capacity will be purchased at a cost of $48,000 to supply 30-minute service between the two cities. Bus fares between the cities will remain the same as charged by the interurban, while city fares on buses in Manitowoc will be 10 cents. Interchangeable transfers will be issued to city and intercity patrons without charge. The interurban tracks between Manitowoc and Two Rivers will be replaced with a 30-ft. concrete highway at the expense of the county.

# Financial and Corporate

## Sale Date at St. Louis Set

**Property of Railway There to Be Sold Under Foreclosure Probably by May 12**

United States District Judge Faris of St. Louis, Mo., on April 1 ordered the public sale of the United Railways, which went into receivership in April, 1919. He approved the recommendation of Special Master Williams that the property be foreclosed and appointed former Congressman William L. Igoe to conduct the sale. The date for the sale was not fixed by the court, but it is likely it will occur about May 12.

It is almost certain that the only bidder at the sale will be the St. Louis Public Service Company, formed by the reorganization committee to take over and operate the system upon the termination of the present receivership. If the property is sold to the reorganization committee Judge Faris would then be called upon to approve the plan of reorganization.

Under the reorganization plan the common stock will be wiped out, but the preferred stock holders will have the right to purchase the common stock of the St. Louis Public Service Company at $12.50 a share.

Judge Faris has fixed an upset price of $46,600,000 for the property. This is sufficient to cover the entire issue of United Railways general 4 per cent bonds and $2,300,000 of suburban consolidated bonds. There is $30,300,000 of the United Railways general bonds outstanding.

Negotiations between the city officials and J. K. Newman of Newman, Saunders & Company, agents for the reorganization committee, relative to a service-at-cost franchise for the railway were resumed on March 31. Little was accomplished at the March 31 meeting as Mayor Miller told Mr. Newman further conferences would be useless until the Public Service Commission hands down its decision on the company's application for an 8-cent fare.

The reorganization committee desires to earn 7 per cent on a valuation of $60,000,000 for the first five years under a 30-year franchise, but Mayor Miller has been contending the company should accept 6 per cent on a valuation of $51,781,348 as of 1919 fixed by the Missouri Public Service Commission plus additions and betterments of about $6,000,000 since that date. This would make the final valuation about $58,000,000.

It is expected that the Public Service Commission's decision on the 8-cent fare application may also include a recommendation as to whether the city should allow a 6 or 7 per cent return.

Recently when Receiver Rolla Wells went into the federal courts in an attempt to obtain an 8-cent fare at once he contended that the real valuation of the railway property is $75,000,000. That move indicated that if the city is not willing to accept the $60,000,000 valuation and grant the reorganized company a 30-year blanket franchise under the service-at-cost plan, it is probable the company may enter the courts for the right to obtain a reasonable return upon a valuation of $75,000,000.

## Traffic Fare and Wage Figures

While there was a slight increase in the electric railway passenger traffic in February, 1927, compared with February, 1926, the increase was much less than has been generally reported in recent months. This is attributed to the extraordinarily good weather conditions during the month, compared with February last year, when there were a number of severe snowstorms.

The number of revenue passengers, including bus passengers, reported to the American Electric Railway Association by 216 companies is as follows:

| | |
|---|---|
| February, 1927 | 781,891,790 |
| February, 1926 | 779,296,724 |
| Increase, per cent | 0.33 |

Average cash fare in cities of 25,000 population and over:

| | Cents |
|---|---|
| March 1, 1927 | 7.8194 |
| February 1, 1927 | 7.7827 |
| March 1, 1926 | 7.65432 |

Average maximum hourly rates paid motormen and conductors in two-man service by companies operating 100 or more miles of single track:

| | Average Hourly Rate, Cents | Index Number 1913=100% Per Cent |
|---|---|---|
| March 1, 1927 | 56.97 | 209.06 |
| February 1, 1927 | 56.94 | 208.95 |
| March 1, 1926 | 56.66 | 207.93 |

## $279,075 Received from Ottawa Electric in 1926

In the thirteenth annual report of the Ottawa Traction Company, Ltd., Ottawa, Canada, T. Ahearn, president, stated that the amount received from the Ottawa Electric Railway for the year ended Dec. 31, 1926, was $279,075, with which was paid the usual quarterly dividends of 1 per cent and a bonus of 1 per cent.

Following the signing of the new agreement with the city of Ottawa in January, 1924, the company had successfully carried on the rehabilitation and modernizing of its railway system. Every department has been carefully scrutinized and its assets put into first-class condition. With the exception of eighteen cars, all the passenger rolling stock is either new or has been rebuilt along modern lines.

A bus department was organized in 1924 and, the report states, consists of nine 21-passenger Reo buses and an up-to-date garage. Mr. Ahearn states that this department is making steady progress and has already justified its creation.

The new car shops were constructed after a careful study of the latest shops in the eastern part of Canada and the United States and embody the latest ideas in shop design. With the shops is carhouse accommodation for about 50 cars, the whole building being arranged so that as more shop accommodation is required with the growth of the system it can be taken from that part of the building which is now used for housing cars.

The entire construction program, entailing an expenditure of $2,250,000, was carried out without interruption.

Mr. Ahearn says that the efforts of the company during 1926 were directed toward the maintenance of the plant and equipment in an efficient condition.

## Character of Missouri Interurban Road's Business Changing

Total gross earnings of the Kansas City, Clay County & St. Joseph Railway, St. Joseph, Mo., for 1926 from operation were $828,176, representing a decrease of $46,239 in comparison with the year 1925. Total net earnings available for interest charges, reserves, etc., for the year 1926 were $222,318, or $35,680 less than in the previous year. After providing for interest on the company's bonds and miscellaneous deductions aggregating $157,358 the year's operations showed net income available for reserves and surplus of $64,959. Of this amount, $17,359 was appropriated for the reserve for depreciation.

During the year $102,000 principal amount of the company's bonds were retired through operation of the sinking fund. There remains in that fund a balance of $50,036 which may be used for the retirement of additional bonds or withdrawn for capital additions to the property.

Approximately 23 per cent of the gross revenues were derived from freight transportation. The character of the freight traffic handled by the road is undergoing a change. There has been a decrease in the less-than-carload or package business due to sharp competition from motor trucks. However, the carload movement has greatly increased. Intensive work is being done to increase joint rates and routes with more of the steam railroads of this territory and to locate along the property of the company active industries productive of carload traffic. The company has physical track connections with the Chicago Great Western, Chicago, Burlington & Quincy and the Chicago, Rock Island & Pacific Railway and indirect connections with all other steam railroads at Kansas City and St. Joseph. Through these facilities approximately 3,500 carloads of freight moved inbound or outbound to or from points on this company's line in 1926. Approximately half of the movement was line haul, and the remainder was handled in switch movement.

Approximately 14,000 cross ties and 170 cedar trolley poles were renewed. More than 400 trolley poles were treated with hot creosote. All track bonding was rehabilitated and twelve passenger cars were overhauled and repainted. In this latter respect a con-

INCOME AND SURPLUS ACCOUNT OF THE KANSAS CITY, CLAY COUNTY & ST. JOSEPH RAILWAY FOR YEAR ENDED DEC. 31, 1926

INCOME ACCOUNT

| | | |
|---|---|---|
| Gross Earnings from Operations: | | |
| Revenue from transportation | | $815,34 |
| Revenue from operations other than transportation | | 12,828 |
| Total gross earnings from operation | | $828,176 |
| Operating Expenses and Taxes: | | |
| Operations | | $439,472 |
| Maintenance | | 159,547 |
| Taxes | | 22,326 |
| Total operating expenses and taxes | | $621,346 |
| Net earnings from operations before depreciation | | $206,829 |
| Add non-operating income | | $15,489 |
| Total net earnings before depreciation | | $222,318 |
| Interest deductions | | $157,358 |
| Surplus net income before depreciation | | $64,959 |

SUMMARY OF SURPLUS ACCOUNT

| | | |
|---|---|---|
| Balance, Jan. 1, 1926 | | $807,933 |
| Add: | | |
| Surplus net income before depreciation | $64,959 | |
| Less depreciation of rolling stock | 17,395 | |
| Net income after depreciation | $47,563 | |
| Refund of federal income tax for years 1917 to 1921 | 2,953 | |
| Discount on $102,000 of first mortgage bonds purchased and canceled | 51,527 | |
| Total additions | | $102,044 |
| | | $909,978 |
| Deduct: | | |
| Portion of unamortized bond discount and expense written off | $11,230 | |
| Premium on United States Treasury notes written off | 1,218 | |
| Normal tax withheld at source | 2,086 | |
| Materials and supplies inventories adjusted | 9,344 | |
| Advertising and purchasing expense on canceled bonds | 397 | |
| Total deductions | | $24,277 |
| Balance, Dec. 31, 1926, per balance sheet | | $885,700 |

siderable saving was effected by substituting a cellular lacquer in lieu of the former paint and varnish method.

The passenger train service furnished by the railroad was substantially the same as that during the past few years, except that on the St. Joseph Division four limited trains were operated, of which two displaced local trains.

The Kansas City, Clay County & St. Joseph Auto Transit Company, which operates bus lines connecting with the company's railroad lines, now has four separate routes, to wit: Kansas City to Excelsior Springs, Kansas City to St. Joseph, Kansas City to Parkville, and, since Dec. 9, 1926, a touring car line between Platte City and the company's railroad line at Ferrelview. Its gross revenues for the year were $120,105. They covered operating expenses, taxes and reserve for depreciation, but provided no return on the capital investment. The details of the revenues of the Auto Transit Company were not included in the income account of the railway.

The company explains that the improvement of the highway between Kansas City and St. Joseph has resulted in a substantial increase in the use of the private automobile, and that as a consequence the railroad suffered from a reduction of 118,971, or 14.4 per cent, in the number of revenue passengers carried on the St. Joseph division. The Excelsior Springs Division, however, recovered some of the loss of passenger business which it has previously suffered from a similar cause, with the result that the total number of revenue passengers carried by the two divisions decreased only 2 per cent.

## Net in Duluth Lower

### Under New Fare Passenger Revenues Increase in 1926—Improvement Noted in Bus Operation

The net income of the Duluth-Superior Traction Company, Duluth, Minn., for the year ended Dec. 31, 1926, transferred to profit and loss showed a decrease of $23,064 compared with the year previous. This disclosure was made in the annual report to the stockholders. The gross revenues for the year showed an increase of $14,448, and operating expenses, including all taxes, showed an increase of $38,799.

Previous to Oct. 15, 1926, at the 6-cent fare the passenger revenue showed a decrease of $50,867 compared with the corresponding period during 1925. On Oct. 4, 1926, the Railroad and Warehouse Commission of Minnesota filed its order fixing the value of the property of the company in the city of Duluth as of Dec. 31, 1925, at $5,291,710 and the rate of return which the company was entitled to receive on such valuation was fixed at 7½ per cent. The rate of fare which was authorized in the city of Duluth was fixed at 8 cents cash, five tickets or tokens to be sold for 35 cents. The new rate of fare became effective on Oct. 15, 1926. From Oct. 15 to Dec. 31, 1926, under the new rate the passenger revenue shows an increase of $25,342 when compared with the corresponding period in 1925.

Depreciation has been accrued and charged monthly to operating expense at the same rate as the previous years, with the exception of the property comprising the Duluth, Minn., Division for the months of October, November and December. During these months depreciation on the Duluth Division has been accrued and charged into operating expense at the rate of $100,000 a year as provided in the order of the Railroad and Warehouse Commission of Minnesota dated Oct. 4, 1926.

A. M. Robertson, president, stated that the management hoped to have the charge for annual depreciation of the property in both Duluth, Minn., and Superior, Wis., fixed and accrued upon a percentage basis which would be uniform in both states instead of a percentage basis in one state and a flat annual amount in the other.

The amount accrued to depreciation reserve during the year 1926 was $194,760. There was expended for renewals and charged against depreciation reserve the sum of $48,402. There was expended for additions to property during the year the sum of $116,801.

Bus service operated as feeders to railway lines has been fully justified, according to Mr. Robertson, and affords a means of supplying transporta-

STATISTICAL STATEMENT OF THE DULUTH-SUPERIOR TRACTION COMPANY

(Street railway only)

| | 1926 | 1925 |
|---|---|---|
| Total revenue | $1,888,303 | $1,905,001 |
| Total operating expense including depreciation | 1,508,472 | 1,494,898 |
| Net revenue | 379,831 | 410,102 |
| Revenue passengers carried | 29,254,508 | 30,638,092 |
| Transfers redeemed | 5,031,592 | 5,309,085 |
| Operating, per cent of revenue, taxes included | 86.73 | 85.58 |

COMPARATIVE STATEMENT OF RAILWAY OPERATING REVENUES*

| | |
|---|---|
| 1917 | $1,621,952 |
| 1918 | 1,665,909 |
| 1919 | 1,937,142 |
| 1920 | 1,919,579 |
| 1921 | 1,777,330 |
| 1922 | 1,784,774 |
| 1923 | 1,904,606 |
| 1924 | 1,789,402 |
| 1925 | 1,873,013 |
| 1926 | 1,849,463 |

*Above comparative statement has been made to conform with the Interstate Commerce Commission's classification of accounts. Non-operating income not included.

TRACK MILEAGE AND PASSENGER EARNINGS PER MILE OF THE DULUTH-SUPERIOR TRACTION COMPANY

(Street railway only)

| | |
|---|---|
| Total miles, single track | 16.94 |
| Total miles, double track | 44.64 |
| Total miles, special track | 6.15 |
| Total miles, all track reduced to single | 112.36 |
| Average total miles, all track reduced to single, operated during 1926 | 110.39 |
| Total miles of street and right-of-way occupied by tracks, 1926 | 61.58 |
| Average total miles of street and right-of-way occupied by tracks, operated during 1926 | 60.37 |
| Revenue from transportation, per mile single track | $16,604.37 |
| Revenue from transportation, per mile street occupied by tracks | $30,362.05 |
| Revenue from transportation | $1,832,956.77 |

CONSOLIDATED INCOME STATEMENT OF THE DULUTH-SUPERIOR TRACTION COMPANY*

| | 1926 | 1925 |
|---|---|---|
| Operating revenues: | | |
| Revenue from transportation | $1,934,636 | $1,928,624 |
| Revenue from other operations | 16,506 | 14,868 |
| Total operating revenues | $1,951,142 | $1,943,493 |
| Operating expenses: | | |
| Way and structures | $213,616 | $209,908 |
| Equipment | 235,637 | 225,193 |
| Power | 176,183 | 178,704 |
| Conducting transportation | 746,487 | 729,398 |
| Traffic | 1,526 | 2,521 |
| General and miscellaneous | 260,065 | 243,109 |
| Transportation for investment-credit | —11,384 | —10,832 |
| Total operating expenses | $1,622,131 | $1,578,012 |
| Net revenue from operations | $329,011 | $365,480 |
| Taxes assignable to operations | $133,974 | $139,294 |
| Operating income | $195,036 | $226,186 |
| Non-operating income: | | |
| Income from funded securities | $22,284 | $15,169 |
| Income from unfunded securities and accounts | 2,425 | 2,456 |
| Income from sinking fund and other reserves | 14,091 | 13,980 |
| Miscellaneous income | 67 | 465 |
| Total non-operating income | $38,869 | $32,070 |
| Gross income | $233,906 | $258,256 |
| Deductions from gross income: | | |
| Interest on funded debt | $169,664 | $171,054 |
| Interest on unfunded debt | 2,740 | 2,736 |
| Miscellaneous debits | 704 | 604 |
| Total deductions from gross income | $173,109 | $174,395 |
| Net income transferred to profit and loss | $60,796 | $83,861 |

*The above income statement includes the results from the operation of the street railway system and motor coaches.

tion service to sparsely settled districts which could not support a railway. The earnings from bus operation during the past year have not been satisfactory, but a steady improvement has been shown and the year 1927 should show still further improvement.

During the year one railway extension of 2.63 miles of track was built in Duluth. This extension is known as the Crosley Avenue line and was put in service on Oct. 1, 1926.

No general mortgage bonds were authenticated or sold during the year, while $28,000, par value, of general mortgage bonds were retired under the sinking fund provision of the mortgage.

The report goes into some detail on the status of the appeal of the city of Duluth to the United States Supreme Court from the order and decision of the United States District Court and the appeal of the city of Duluth from the decision of the District Court of St. Louis County.

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**Revenue at Youngstown Holds Up Well.**—The revenue of the Youngstown Municipal Railway, Youngstown, Ohio, during January was $184,679, compared with $185,393 for a similar month of 1926. During the first month of the year the revenue failed by $10,762 of paying all expenses, including a return on the investment.

**Will Remove Tracks.** — The Pacific Electric Railway has been granted permission by the California Railroad Commission to abandon and remove the tracks on its San Antonio Heights Line in the county of San Bernardino.

**Files Abandonment Petition.** — The New York & Stamford Railway filed a petition on April 4 with the Public Service Commission asking for the approval of a declaration of abandonment of its railway lines in the village of Port Chester, Westchester County, on North Main Street from Mill Street to the state line between New York and Connecticut. A public hearing will be held on this petition. This is part of the plan for readjustment to which reference has been made before in the JOURNAL.

**May Reimburse Treasury.**—The Key System Transit Company, Oakland, Cal., has been authorized by the Railroad Commission, in a supplemental order, to use $175,740 of the proceeds received from the sale of bonds heretofore authorized by the commission to reimburse its treasury.

**Revenue in San Diego $1,667,519.**—The San Diego Electric Railway, San Diego, Cal., reports to the Railroad Commission its 1926 operating revenue at $1,667,519, compared with $1,608,501 for 1925. The operating expenses, excluding taxes for 1926, are reported at $1,350,373, and at $1,405,130 for 1925, leaving net operating revenue of $317,146 for 1926 and $203,371 for 1925. During 1926 taxes charged to operation amounted to $113,828 and for 1925 to $106,583. Deducting the taxes leaves operating income of $203,318 for 1926 and $96,788 for 1925. Adding to the operating income the non-operating income of the company and deducting non-collectible revenue and rents results in a gross corporate income, which represents the amount available for interest, amortization of debt discount, other fixed charges, non-operating expenses, dividends and surplus, of $303,888 for 1926 and $175,822 for 1925.

**Net Income Lower.**—For the eight months period ended Feb. 28, 1927, the passenger revenue of the Brooklyn City Railroad, Brooklyn, N. Y., was $7,518,803, against $7,486,575 for a similar period last year. Operating expenses and taxes increased from $6,394,466 for the eight months period ended Feb. 28, 1926, to $6,542,038 for the 1927 period. After the consideration of income deductions a net corporate income remained this year of $766,626, against $930,680 in the eight months period ended Feb. 28, 1926.

**Service Discontinued.**—The Sacramento Northern Railway has been granted permission by the California Railroad Commission to discontinue passenger service over its Suisun-Vacaville branch in the county of Solano. The commission found that the service was not required by public convenience and necessity.

**Abandonment Petition Dismissed.**—Application of the Utah-Idaho Central Railroad for permission to abandon its passenger service between Ogden and Plain City, Utah, has been dismissed without prejudice by the Utah Public Utilities Commission.

**Rail Lines at Tampico to Discontinue.**—All of the railway lines of the Tampico Electric Company, Tampico, Mexico, except the one which runs from Tampico to the beach resort suburb of Miramar, were shut down on March 14. Whether or not the suspension will be permanent will depend on future conditions. Should there be no indications of improvement in patronage, the tracks will be taken up and the rails along with other equipment sold, it was stated. The Tampico Electric Company is owned by British interests.

**New Directors Elected.**—Harold J. Gallagher, New York, and W. Graham Boyce, vice-president of the Union Trust Company, were elected directors of the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., at the recent annual meeting. They succeeded J. H. Beatson and R. W. Graham, Baltimore.

**Cable Road Reports.**—The California Street Cable Railroad, operating in San Francisco, reports to the Railroad Commission its 1926 operating revenue at $532,537, compared with $557,858 for 1925. The operating expenses, excluding taxes for 1926, are reported at $462,344, and at $412,082 for 1925, leaving net operating revenue of $70,193 for 1926 and $145,776 for 1925. During 1926 taxes charged to operation amounted to $49,858, and for 1925 to $49,405. Deducting the taxes leaves operating income of $20,334 for 1926 and $96,370 for 1925. Adding to the operating income the non-operating income of the company and deducting non-collectible revenue and rents results in a gross corporate income, which represents the amount available for interest, amortization of debt discount, other fixed charges, non-operating expenses, dividends and surplus, of $41,869 for 1926 and $117,624 for 1925.

**Net Income Up in St. Paul.**—Total operating revenue of the St. Paul City Railway, St. Paul, Minn., for February was $391,008 compared with the January income of $428,574 and a total revenue of $402,566 for February, 1926. The operating expenses were $280,881, compared with $299,216 for the similar period a year ago. Operating expenses for February, 1927, were cut nearly $19,000 below similar expenses in February, 1926. Because of the sharp reduction in operating costs, the net income of the company for February, however, showed an increase of approximately $7,500 over the income of the corresponding month a year ago, despite a drop of $11,500 in total operating revenue. Net income for February was $24,575, after all deductions for taxes, operating expenses and miscellaneous debits had been made.

**Would Dispose of Property.**—The Pacific Electric Railway has applied to the California Railroad Commission for permission to sell its resort property in the city of Redondo Beach, Los Angeles County, valued at $1,800,000, to T. R. Gardner for a corporation to be chartered for the purpose of taking over and operating the property and designated as the Amusement Company. The Pacific Electric Railway has also requested permission of the Railroad Commission to dispose of certain real estate located along its Newport Beach Line in the city of Long Beach and in the city of Seal Beach, valued at $126,000.

**Slight Earnings Decrease on Indiana Road.**—The net income of the Terre Haute, Indianapolis & Eastern Traction Company for 1926 shows a decrease of $14,988 under the net income for 1925, according to a financial statement of the company filed with the Indiana Public Service Commission. The net income for 1926 was $137,929. Operating revenue was $3,155,296. Operating expenses were $3,129,919. The gross income was $1,185,513. The report shows, among deductions, $676,897 interest on the funded debt and $55,847 interest on unfunded debt. The total valuation of the property is $18,200,000.

**Offers New Prior Lien Issue.**—The first public offering of 6 per cent cumulative prior lien stock of the Midland Utilities Company, Chicago, Ill., was made March 24. The Midland Utilities controls the Chicago, South Shore & South Bend, the Gary Railways and Indiana Service Corporation. A new issue of 25,000 shares of this stock has been authorized and 15,000 shares is being offered to investors by the Utility Securities Company, Chicago, and the Central States Securities Corporation, New York. The additional 10,000 shares, which will be offered in the near future, take the place of 10,000 shares of 7 per cent prior lien stock which was repurchased and converted into 6 per cent stock. The stock is being sold at $92.50, to yield about 6.50 per cent. Dividends on other prior lien and preferred stocks are payable at the rate of 7 per cent annually. The new 6 per cent prior lien stock is on a parity in all respects with the 7 per cent prior lien stock except as to the annual dividend rate and the callable price, which is $110 per share.

# Book Reviews

### Profit Sharing and Stock Ownership for Employees

By Gorton James, Henry S. Dennison, Edwin F. Gay, Henry P. Kendall and Arthur W. Burritt. New York: Harper & Brothers. 394 pages. Price $4.

Profit motive is a strong force. As the authors point out, it may well be utilized in some one of its manifold forms as an agent of efficient management and of social betterment. The point of the present volume, however, is not only that it can and should be so used, but that its application demands an understanding of its principles and an analysis of the situation it is meant to fill.

Within these pages is a study of principles. There are no recommendations of ready-made plans, since, as the authors say, no plan is uniformly applicable to all situations. The hope of the authors is merely that the book will help managements to find the points of usefulness of profit sharing as well as to recognize the places in which it is not effective.

The present volume really is the successor to "Profit Sharing, Its Principles and Practice," published in 1918. That book has, in the present volume, been entirely rewritten, for since its publication there has been a steady and continued interest in the subject, while at the same time the business world has gone through changing conditions which have tested the various plans and revealed in many ways their points of weakness and strength. Moreover, there has recently been a wide use of employee stock participation to serve equivalent purposes if not identical ones.

The authors say that the principal conclusions of the former volume as to the great strength of the profit motive, when effectively applied, have been sustained and strengthened by the facts of experience, but that there has been some modification of previous conclusions regarding specific applications of the principles. Especially has it been proved that profit sharing and management sharing are very closely interdependent, and this fact has led to the addition of several chapters to the present edition. Furthermore, the use of stock participation has been studied, in so far as it has been used in place of profit sharing, or for the same purposes, and this subject has formed the basis for three additional chapters. The volume is wide in its appeal to railway executives.

### What a Business Executive Should Know About Patents

By Roger Sherman Hoar, head of the patent department of the Bucyrus Company. New York, N. Y.: Ronald Press Company, 1926. 22 pages, bound in paper. 6x9 in. Price $4.50.

All things considered, the author has achieved well his object to prepare a treatise on tactics plus a translation into plain English of so much of the patent law as will enable a business executive to understand his attorney and to co-operate fully with him. This is said even with the fact in mind that the "business executive" is the one in charge of a manufacturing business and not the head of a transportation business.

With this end in mind the emphasis of the author is placed on patent applications, interferences and searches and on the contractual arrangement desirable in case of licenses. Considerable attention is paid to the problems of the inventor, the employer and employees, the right to repair patented machines and to the shop rights that may be developed when an employee has invented something that may be built outside. The chapters on infringements and on the choice of an attorney discuss many practical matters not usually put down on paper, but still of importance to any one interested in the patent question. In conclusion, the author summarizes a number of misconceptions about the whole matter far too prevalent even among those who are not without experience in dealing with patent problems.

### Street Railway Transportation in Cincinnati

By Rebecca Van Hamm. Vocational Pamphlet of the Cincinnati Public Schools, No. 6. 64 pages.

Did you ever want to be a motorman when you were a boy? "Street Railway Transportation in Cincinnati" opens up new vistas of thought for the high school boy of today in choosing a life work, and it goes into the fields of mechanical, electrical and civil engineering. In fact, the story of railway transportation in Cincinnati is the sixth of a series of vocational studies for junior high school boys and girls, presented in pamphlet form and published by the Board of Education of Cincinnati, and the first of the public utilities in this series to be discussed. It develops all of the allied vocations in every line connected with the electric railway industry. Its author, Miss Rebecca Van Hamm, has brought together two great civic bodies, the Cincinnati Street Railway and the Board of Education.

She has shown the student his relation to the community through the very car on which he rides to and from school. How many more advantages he has today than his father yesterday are told in the introductory chapter. Health and safety of the workers whom he meets every day, the various organizations with which they are connected, how they are at work in constructing lines, their duties in the carhouses, shops and power stations; how they are instructed before they are allowed to go out on their new jobs; how they spend their moments of recreation in the shelter rooms; how their wages are determined; how many passengers ride on the cars every day, and statistics of the transportation department's functioning are all woven into this brief text and portrayed by pictures and charts.

In the glimpse into the future, the author asks the question, "How shall we come to town, or ride to school 25 years from today?" The student will be better prepared to think along these lines after reading some of the books and magazines appendixed to the text in the bibliography.

### Switching Equipment for Power Control

By Stephen Q. Hayes, A.B., E.E., general engineer Westinghouse Electric & Manufacturing Company. Second edition. New York, N. Y.: McGraw-Hill Book Company, Inc. 556 pages. Price $5.

Progress in the design of generators, transformers and other electric machinery since the first edition of this book has made it desirable to bring the contents abreast of present practice. A number of European ideas have also been incorporated in the revision.

In America there has been a great development of the steel-clad switchgear, represented by truck panels, truck type oil circuit breakers, steel switchhouses for outdoor service and steel switchboards. In the second edition of this book a separate chapter has been devoted to these advances. A separate chapter has also been allotted to automatic substations so as to take care of the advances made in automatic railway substations, also automatic stations for d.c. light and power, substations for mining service, automatic hydro stations and similar automatic equipment. There is a discussion of supervisory control and a certain amount of information for load dispatching. The tying together of neighboring power systems has introduced many interesting problems connected with voltage adjustment and regulation by means of induction regulators, step induction regulators and ratio adjusters or tap changers to permit change of transformer ratio under load. A chapter is devoted to this subject.

The author describes the switching apparatus approximately in the order in which the various devices were developed and then proceeds to the consideration of the main connections desired in a power plant and the means of carrying them out so as to obtain the maximum amount of security and flexibility with minimum outlay. Switchboard panels, control desks, etc., are considered next with the location of breakers, bus structures, etc. Description of apparatus has been confined almost exclusively to present-day standards.

### Employment Statistics for the United States

By Ralph C. Hurlin of Russell Sage Foundation and William A. Berridge of Brown University. 215 pages. Price, $2.50.

This is a plan for a national collection of statistics and a handbook of methods recommended by the committee on governmental labor statistics of the American Statistical Association. It presents the consensus of opinion of the members of that committee concerning problems involved in the collection and publication of adequate employment statistics for the United States.

# Personal Items

## Stone & Webster Confer Honor

### In Promotion of Messrs. Clifford, Burke, Townsend, Wentworth, Management Recognizes Long Service Records—Careers of New Incumbents Reviewed

SINCE April 1 the Boston office of Stone & Webster, Inc., has been enriched by the services of George H. Clifford, who was recently appointed division manager in charge of the companies located in the Southwestern district, the Virginia Electric & Power Company and subsidiaries and the northern district properties of the Eastern Texas Electric Company. This change, along with several others, was referred to in the ELECTRIC RAILWAY JOURNAL, issue of March 5, 1927, page 438.

W. H. Burke

G. H. Clifford

A. S. Townsend

Mr. Clifford brings to his new position a record of valuable experiences, gained mostly on the Stone & Webster properties. About 26 years ago he entered the service of the Northern Texas Traction Company as secretary to F. M. Haines, general manager of the company, owned by the Bishop & Sherwin syndicate of Cleveland. Two years later Mr. Clifford was made secretary and treasurer. He held this position until 1905, when the property was purchased by Stone & Webster. After the change in ownership he was made general superintendent and in 1910 was elected vice-president and general manager of the Northern Texas Traction Company and in addition general manager of the Fort Worth Southern Traction Company, operating 32 miles of interurban line between Fort Worth and Cleburne. A little less than two years ago Mr. Clifford was made Southwestern district manager over all Stone & Webster properties in Texas, Louisiana and New Mexico. The properties involved embraced companies with many diversified interests, but his talents proved equal to the responsibilities imposed upon him. Mr. Clifford was born at Fort Worth in 1881. He was graduated from the public schools and attended Weatherford College.

Walter H. Burke, the new district manager in the Southwestern district, was appointed less than two years ago manager of the Northern Texas Traction Company of Fort Worth and the Tarrant County Traction Company. He went to Fort Worth at that time from the Houghton County Traction Company as successor to Mr. Clifford. Mr. Burke, too, has been identified with the Stone & Webster organization for many years. He entered the statistical department at the Boston office in 1910, remaining there for a year.

In 1911 he was sent to Dallas as clerk to E. T. Moore, then manager of the Dallas group of utilities under Stone & Webster management. Later he left Stone & Webster to go to Milwaukee and assumed the position of manager of the light and power operations of the Milwaukee Electric Railway & Light Company. However, in 1915 he was back again in the Boston office of Stone & Webster as assistant to M. M. Phinney, who was vice-president of the Stone & Webster Management Association. His next move was to Keokuk, Iowa, where he served as manager of the Keokuk Electric Company. From there he went to the Houghton County Traction and the Houghton County Electric Light Company. Mr. Burke was born in Maine. He was educated at the University of Maine, where he took an electrical engineering course. He was graduated in 1906. Following his graduation he spent about two years with various companies in New York and Pennsylvania on power house and substation operation and maintenance.

Alfred S. Townsend, formerly manager of the Florida Motor Lines, Inc., and its affiliated companies and vice-president of the Florida Motor Lines, Inc., is now manager of the Northern Texas Traction Company and the Tarrant County Traction Company. He has been associated with Stone & Webster for the past 26 years and during that time has been identified with the utilities at Lowell, Mass.; Ponce, Porto Rico, and Sydney, Nova Scotia. In 1916 he was appointed manager of the properties at Beaumont and Port Arthur, included in the Eastern Texas Electric Company.

Mr. Townsend began his career in the electrical industry with the Lewiston & Auburn Electric Light Company, filling various positions with the company until he was made general superintendent in 1898, serving in that capacity for about two years. In 1925 Mr. Townsend was appointed vice-president and general manager of the operating subsidiary company of the Western United Corporation with headquarters at Aurora, Ill. These subsidiary companies had previously signed contracts with Stone & Webster for executive management service. To Mr. Townsend will fall the task of preserving the reputation of the progressive company at Fort Worth. The company a few years ago won the Coffin medal and has aspiration for that distinction again this year. Recently the management instituted a cash fare of 10 cents and a ticket fare of 40 cents a week plus 5 cents per ride. The officials believe that the new rate schedule will help not only to build volume but will really solve the fare problem for the infrequent rider, the casual rider and the wholesale rider.

Philip M. Wentworth, who will replace Alfred F. Townsend as manager of the Florida Motor Lines, Inc., and its affiliated companies, was formerly manager of the Truckee River Power Company, Reno, Nev. Later he served as manager of the Fort Madison Company in Fort Madison, Iowa, and also manager of the Dallas City, Ill., Light Company. He succeeded Walter M. Bird in 1924 as manager of the Keokuk company.

## C. A. Semrad Succeeds S. B. Irelan at St. Joseph

Charles A. Semrad, vice-president and commercial manager of the Public Service Company of Colorado, Denver, has been made vice-president and general manager of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo. He succeeds S. B. Irelan, recently appointed Western manager of the securities department of Henry L. Doherty & Company.

Mr. Semrad became associated with the Boulder office of the Northern Colorado Power Company in 1912. A year previous to that he had assumed management of the Cheyenne Light, Fuel & Power Company, Cheyenne, Wyo., a subsidiary of the Northern Colorado Power Company, and later became manager of the Western Light & Power Company's properties, with headquarters at Boulder. Six years later Mr. Semrad was transferred to Denver to assume the duties of vice-president and commercial manager, which position he has held until his recent promotion. He is a graduate of the University of Wisconsin, class of 1907.

## Promotions in Charlotte

A. B. Skelding, manager of the branch of the Southern Public Utilities Company at Charlotte, N. C., resigned, effective on April 1. His successor is Harry A. Orr, who has been manager of the Anderson branch since that city has been included in the Southern Public Utilities System. Coincident with the announcement of Mr. Orr's succession to the managership of the Charlotte branch, E. C. Marshall, president of the company, announced the appointment of T. F. Hill to succeed Mr. Orr at Anderson.

The former manager at Charlotte has interested himself in the formation of the Piedmont Wood Preserving Company, a new $100,000 corporation, being organized to establish a wood preserving plant near Charlotte. He will be president and treasurer of the new enterprise. At one time he organized and operated a wood preservation plant as a department of the Tidewater Power Company at Wilmington. Mr. Skelding has been manager of the Charlotte branch of the company for the past six years.

Harry A. Orr, his successor, has been engaged in utilities work since his college days. He was graduated from the Alabama Polytechnic Institute at Albany, Ala., where he specialized in electrical engineering. Following his graduation he spent two years in the engineering department of the General Electric Company at Pittsfield. When the Anderson Water, Light & Power Company was purchased by the Southern Utilities Company and became a branch of that system Mr. Orr was made manager of the Anderson branch of this company. This position he has filled since the transfer was made in 1912.

Thomas F. Hill, who succeeds Mr. Orr at Anderson, has also spent practically all of his time since his graduation from Wofford College with the utilities in Anderson. He joined the old Anderson Traction Company in 1909 and became its superintendent in 1914.

## Engineering Firm Established

William H. Baker and C. G. Spencer announces the organization of the firm of Baker & Spencer, Inc., for the general practice of engineering and construction at 117 Liberty Street, New York City, N. Y.

Mr. Baker has had broad experience in investigating, financing, organizing and managing industrial businesses following an extensive engineering training. He was graduated from Cornell in 1901 and spent six years in diversified design and construction. He acted for ten years in managerial capacities for the Atlas Portland Cement Company, two years as vice-president and general manager of the Hardinge Company, three years as president of the Quigley Fuel Systems, Inc., two years as president of the Acme Cement Corporation and one year, until his resignation to organize this firm, as vice-president of the North American Cement Corporation.

Mr. Spencer, since his graduation from Cornell in 1904, has been engaged in the design, construction and operation of projects, including power plants for industrials and public utilities, railway electrification, passenger stations and repair shops, war construction, industrial plants for foundry and machine shops, leather tanning, copper wire and cable, paper making and cement manufacture during nine years with Westinghouse, Church, Kerr & Company, three years with the Toronto Power Company, two years with the Chile Exploration Company in South America, two years in the United States Army, two years with the American Sugar Refining Company and five years with McClellan & Junkersfeld, Inc., New York.

## McGraw-Hill Editor Will Report Geneva Conference

In order to give American industrialists and engineers first-hand information on the deliberations and conclusions of the international Economic Conference at Geneva, the McGraw-Hill Publishing Company, Inc., publisher of the ELECTRIC RAILWAY JOURNAL, is sending Edward J. Mehren, one of its vice-presidents, to the meeting. He will sail on the same ship with the American delegates and experts on April 20.

Mr. Mehren has a broad knowledge of American industry and engineering. Joining the staff of *Engineering Record* more than twenty years ago, he became in turn editor of *Engineering Record*, editor of *Engineering News-Record* and vice-president and chairman of the editorial board of the McGraw-Hill Publishing Company, Inc. In his editorial travels he has covered engineering and industrial developments in every part of the United States, in eastern Canada and in the leading countries of western Europe.

In addition to his experience gained through his editorial and publishing work, Mr. Mehren was at one time manager of the Emerson Company, thus securing an intimate insight into management technique. He was one of the organizers of the National Association of Corporation Schools and of the wartime Highway Industries Association. He has been a director of the New York Building Congress and is a director of the American Arbitration Association and chairman of the arbitration committee of the American Society of Civil Engineers.

Mr. Mehren's ability as a public speaker makes him much in demand for meetings of industrial and engineering associations and societies.

## Grandville Officers Elected

At a recent directors' meeting of the newly organized United Suburban Railway, Grandville, Mich., F. F. McCarrick, Grandville, was elected president of the railroad. Other officers elected by the board were Paul E. Gezon, Wyoming Park, vice-president, and Harold T. Slaght, Grandville, secretary and treasurer.

This company is the successor to the defunct Grand Rapids, Holland & Chicago Interurban line between Grand Rapids and Jenison. Mention of this project has been made previously.

## Changes in Detroit Municipal Personnel

John A. Mulqueen has resigned as supervisor of employment of the Department of Street Railways of the City of Detroit, Mich. William S. Ready, who has been in charge of the instruction of new men in the department, has been named by General Manager Del A. Smith as temporary successor to Mr. Mulqueen.

Frank J. Denny has resigned as assistant general manager and director of publicity for the Department of Street Railways. Mr. Denny, a former newspaper man, entered the railway organization about twenty months ago as assistant to Col. H. U. Wallace, former general manager.

The appointment of Fred A. Nolan, former assistant auditor, has been announced by the street railway department to fill the position of assistant general manager made vacant by Mr. Denny's resignation.

# Obituary

## Jilson J. Coleman

Scarcely five months since his friends honored him with the presidency of the Pennsylvania Street Railway Association, they escorted the body of Jilson J. Coleman, vice-president and general manager of the Scranton Railway, Scranton, Pa., to his final resting place in Louisville, Ky. There, beside the scenes of his early boyhood, were interred the remains of one of the oldest executives in point of service among electric railway operators in the United States.

Something of the appreciation felt for Mr. Coleman was noted in the spring of last year when he was promoted to the position of operating vice-president by A. E. Fitkin, who, under the General Engineering & Management Corporation, purchased the Scranton Railway. Mr. Coleman at that time was retained to continue his duties as general manager. During the past six months, however, since Mr. Coleman's gradual decline in health, he devoted much of his time to legislative matters of the company, leaving a great deal of the daily operation of the concern in the hands of Operating Manager Harry Dartt. When Day & Zimmermann of Philadelphia secured the controlling interest in the railway from A. E. Fitkin, Mr. Coleman received a telegram in which it was stated that no changes would be made in the operating personnel of the company.

Mr. Coleman started on his railway career in Louisville, Ky., in 1882 as a clerk for the Central Passenger Railway. He worked his way up to the position of chief clerk, and then managed the lines in New Albany, Ind. Later he moved to Cleveland and assisted Tom L. Johnson in electrifying the horse car lines there. After the work was completed Mr. Coleman helped to build the line from Allentown to South Bethlehem, and from Allentown to Catasauqua. The company at Allentown purchased the line from Allentown to Bethlehem and consoli-

dated the two companies. Mr. Coleman was engaged in the work of rehabilitating the Yonkers systems and later started the Nassau Electric Railroad, Brooklyn, N. Y., now included in the Brooklyn-Manhattan Transit System. He managed the consolidation of the St. Louis and Washington systems for Brown Brothers, New York bankers, and built the line of the New Jersey & Pennsylvania Traction Company between Trenton and Princeton.

The late Scrantonian, who was 69 years old, was well known for his work in connection with the Shipping Board, Emergency Fleet Corporation, under A. Merritt Taylor, former transit commissioner of Philadelphia. In this capacity he saw that ample transportation was provided for the shipbuilders between Boston, Mass., and Houston, Tex.

In 1920 Mr. Coleman became general manager of the Scranton Railway. During the seven years of his régime on that property many improvements and changes have been brought about. The rolling stock has been greatly increased and more than $250,000 has been spent for the purchase of the latest type cars during the past eighteen months. Improved schedules have resulted on practically all of the carlines, and many miles of new track and roadbed have been laid.

### Major S. L. Nelson

Major Samuel L. Nelson, pioneer utility magnate in the Middle West and distinguished in the World War, died on March 30 in the Pastime U. S. Veterans' hospital at Tucson, Ariz. He began his career as a waterboy with the Baltimore & Ohio Railroad and became train dispatcher, going to Illinois as a manager for the Western Union Telegraph Company. In 1886, when the late W. B. McKinley was laying the foundation of the great utility enterprises he formed, Major Nelson became associated with him, having a large part in the development of the railway and water works in Champaign, Ill. Later he was active in other McKinley utilities. He served in various executive capacities, including the presidency of several of the McKinley enterprises, and later helped to rebuild the railway at Wichita, Kan. Major Nelson went to Peoria eighteen years ago to take charge of the electric railway system and engaged in other financial and industrial activities there. At the age of 58 he enlisted at the same time as his son and served 39 months in the World War. He was 68 years old.

**Rudolph Henry Peppmuller**, for 21 years with the New York Rapid Transit Commission, now the Board of Transportation, died on April 4. In 1906 Mr. Peppmuller joined the staff of the Board of Rapid Transit Railroad Commissioners of New York City as an assistant architect and was assigned to design the stations for the first subway. Since then he had specialized in that branch of rapid transit construction and he drew the specifications for the contracts for the construction of the subway stations. Mr. Peppmuller was born in Staten Island 53 years ago. He studied at the Stapleton, S. I., Academy; Columbia University; Beaux Arts, Paris, and Rome.

# Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

## International Economic Conference to Meet

To determine the economic difficulties which prevent the revival of general prosperity, principally in Europe, and to acertain the best methods of overcoming these difficulties are the purposes of the International Economic Conference which will be convened at Geneva on May 4, under the general auspices of the League of Nations. Five delegates have been appointed by President Coolidge they will be accompanied by experts selected from government departments. Non-member nations as well as member nations have been asked by the league to send delegates. The acts of the delegates are not binding on their respective governments.

For more than a year a committee of 35 persons, drawn from 21 countries, has been working on the agenda and upon the data to be laid before the delegates. The topics fall under four heads. The first revolves about two main inquiries: An analysis of economic causes of the present disturbed equilibrium in commerce and industry, and a study of the economic tendencies capable of affecting the peace of the world.

Commerce questions, such as tariffs, import and export prohibitions and restrictions, monopolization and limitation of trade, dumping legislation and subsidies form the second group of studies. A particular inquiry into this group relates to the repercussion upon international commerce of reduced purchasing power.

Industrial problems come next and include study and discussion of:

1. The situation of principal industries, relating to productive capacity, output, consumption and employment.
2. Industrial, commercial and monetary causes of present difficulties of industry.
3. International industrial agreements as they affect producers, consumer and labor.
4. Production statistics.

Documents have been prepared, under the industrial classification, on coal, iron and steel, shipbuilding, the chemical industry, the electrical industry, legislation on cartels and combines, industrial management and standardization, technical and scientific progress and research, and on technical education and recruitment of technical staff.

Agriculture and its difficulties close the agenda.

In the preparation of the data for the delegates, the preparatory committee was assisted by the International Labor Office, the International Institute of Agriculture and the International Chamber of Commerce.

It is expected that topics that cannot be adequately traversed during the conference session will be referred to subcommittees for further study and report.

A characteristic of the conference is to be the breadth of its composition, the participating governments having been specifically asked to name delegates whose experience qualifies them as experts in the subjects to be discussed. In the preparatory committee, considered indicative of the composition of the conference itself, were economists, producers, merchants, financiers and representatives of labor and of consumers. The preparatory committee considers this broad representation an assurance that the conclusions will be free from the bias incident to conferences of special groups. Included in the committee were such men as Georges Theunis, Belgium; Sir Arthur Balfour, England; Ernesto Belloni, manufacturer, Milan, Italy; W. T. Layton, editor of the *Economist*, London, and Prof. Allyn Young of Harvard University.

## Begin to Plan for Cleveland Now!

Diagrams of space layout for the convention of the American Electric Railway Association at Cleveland, Ohio, next October and applications for space will go out on May 16 this year instead of June 1, as has been the practice in the past.

It will be recalled that the exhibit committee voted at Cleveland on March 18 to accord all prospective exhibitors 30 days in which to file space requests. All applications received up to the close of business June 15 will receive the consideration of the exhibit committee when it meets on June 22 to make the official space assignment. Applications received after June 15 will be awarded space by the director of exhibits in the order in which they are received.

The suggestion is made that intending exhibitors plan their exhibit for the Cleveland convention now and be ready to file space requests promptly upon receipt of application blanks.

## Twin City Officers in Motors Corporation

T. J. McGill of the Twin City Rapid Transit Company and H. L. Bollum of the Twin City Motor Bus Company, a subsidiary of the Twin City Rapid Transit Company, Minneapolis, Minn., are members of the board of directors of the newly formed C. H. Will Motors Corporation, which will manufacture trucks and buses. To start the company has orders from two companies for 40 buses.

The Will corporation has bought the business and assets of Wilcox Trux, Inc., a long established manufacturer of motor cars, trucks and buses, lately manufacturing only trucks and buses. The Wilcox factory will be operated until May 1, when a building at 1030 Ramsey Street, Northeast, containing 50,000 sq.ft. of space, will be occupied, with option for purchase. The first year 200 men will be employed on a

production plan of more than $2,000,000.

Other directors are Paul Tibbetts, G. W. Traer, Edwin White, St. Paul, and R. F. Pack of the Northern States Power Company. Officers will be: C. H. Will, president; O. S. Caesar, vice-president; J. H. Colman, secretary.

## Two New Westinghouse Electric Locomotives for South Shore Line

Orders for two standard 53-ton electric locomotives were placed on April 4 with the Westinghouse Electric & Manufacturing Company by the Chicago, South Shore & South Bend Railroad. The new locomotives will be of the type known as B-1. They will cost approximately $70,000.

In order to speed up the delivery of the locomotives, the South Shore Line has sent to the Pittsburgh manufacturer a consignment of electrical apparatus suitable for 1,500-volt direct-current operation. It is understood that the Westinghouse plant has on hand two new 750-volt electric locomotives which can readily be equipped for operation on the higher voltage of the South Shore Line.

The new locomotives will be used in switching service and for miscellaneous hauling and will increase the company's freight motive power units to six. At present four 80-ton engines are being operated in regular freight service. Increased freight business, and prospects of even greater growth during the summer, is the reason for the purchase of the additional locomotives, according to Charles H. Jones, general manager.

# Metal Markets Dull; Prices Lower

DOMESTIC markets for the major non-ferrous metals were dull during the week ended April 6. Even zinc and lead, which had been moderately active in recent weeks, were very quiet. Although some sellers are asking 13.125 cents in the East for copper, this price has been shaded on small sales the last two days. On Monday the New York price for lead was cut from 7.35 cents to 7.25 cents, and the prevailing figure in St. Louis is now 7 cents. Zinc fluctuated within narrow limits during the week, but was a shade easier on April 6 than the Wednesday previous. Tin has been firm in spite of a small volume of business on the part of consumers. Buying on account of both India and China has had the effect of strengthening silver quotations, a net advance of one cent to 57¼ cents being recorded for the week. Platinum and palladium are quiet and weak, with lower prices prevailing in the outside market, although the "official" price of platinum has not been changed. In spite of the Chinese situation, antimony has weakened, owing to the lack of interest on the part of buyers.

Another week, making five weeks in all, has gone by with an exceedingly slim volume of sales in the copper market. The entire tonnage sold during the last five weeks is little more than half that which changed hands in the single record-breaking week of February. Sellers are convinced that a large volume of buying must be piling up and that when the ice is broken business will be brisk. On March 30 most sellers were asking 13¼ cents delivered, but on Friday one large producer cut its price to 13.125 cents and on April 4 most of the others joined the procession. April 5 one interest that was anxious to sell a limited tonnage cut to 13 cents in order to do business. Of two transactions on April 6 one was at 13 cents and the other at 13.05 cents.

Although buying has been exceedingly limited, prices for zinc have eased only slightly. Galvanizers are reluctant buyers and in some instances have asked that April shipments be deferred. However, it is generally agreed that smelter production will show a material decline. High grade continues dull at 8½ cents delivery in the New York district.

On April 4 the American Smelting & Refining Company again reduced its contract price for New York lead, dropping from 7.35 to 7.25 cents. The reduction followed several very quiet days in a market which has been disappointing for several weeks. In the Middle West, as in the East, the market has been dull. The leading producers booked most of their business at 7.05 to 7.075 cents, St. Louis, until the A. S. & R. reduction on April 4, since which time an even 7 cents has ruled. Resale lots have sold at 6.975 cents, but offerings of this character seem now to be pretty well cleaned up. Corroding grades of lead are quoted at $2 to $3 per ton above common.

Spot supplies of tin continue scarce, and spot Straits has lately held close to 70 cents—in fact, reaching that level on Monday. July is about 3 cents less, and April about ¾ cent under spot.

METAL, COAL AND MATERIAL PRICES
F. O. B. REFINING

| Metals—New York | April 5, 1927 |
|---|---|
| Copper, electrolytic, cents per lb | 12.83 |
| Copper wire, cents per lb | 15.25 |
| Lead, cents per lb | 7.25 |
| Zinc, cents per lb | 6.88 |
| Tin, Straits, cents per lb | 69.625 |
| **Bituminous Coal, f.o.b. Mines** | |
| Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons | $4.975 |
| Somerset mine run, Boston, net tons | 1.975 |
| Pittsburgh mine run, Pittsburgh, net tons | 2.05 |
| Franklin, Ill., screenings, Chicago, net tons | 2.25 |
| Central, Ill., screenings, Chicago, net tons | 1.875 |
| Kansas screenings, Kansas City, net tons | 2.50 |
| **Materials** | |
| Rubber-covered wire, N. Y., No. 14, per 1,000 ft | $5.50 |
| Weatherproof wire base, N. Y., cents per lb. | 16.75 |
| Cement, Chicago net prices, without bags | 2.05 |
| Linseed oil (5-bbl. lots), N. Y., cents per lb. | 10.90 |
| White lead in oil (100-lb. keg), N. Y., cents per lb | 14.50 |
| Turpentine (bbl. lots), N. Y., per gal | $0.74 |

## Virtues of Timken-Detroit Vehicle Brought to Possible Users' Doors

The new, specially built "Timken-Detroit" de luxe motor coach of the Timken-Detroit Axle Company is starting an itinerary that will include most of the states of the Union. It is the intention to bring to the users' doors the virtues of Timken axles and the most efficient way of caring for those in service.

The educational motor coach is complete in itself. It contains luxurious, leather-upholstered, individual chairs for twenty passengers, and in an emergency temporary seats are available for an additional twenty persons. An ice chest is provided to care for food, and large tanks are provided for drinking water. A special silver screen, which disappears into the ceiling, is provided to receive a motion picture projected from the desk in the rear of the coach. This enables an audience of forty persons, all seated comfortably in the coach, to witness the story of how Timken axles are built and serviced. In a corner of the desk at the rear of the coach a small worm-drive unit is concealed.

The interior of the coach is of natural finished mahogany. Seats are of blue leather. Protected electric fans and Pullman type ventilators are installed in the ceiling. A glass transom gives light in the daytime, and makes adequate fresh air available at all times—no matter how crowded the coach may be. The exterior is blue, trimmed in cream. Tastefully colored shades and awnings protect the passengers from the sunlight. Frosted shaded lamps make it possible to read at night without eyestrain. In fact, the coach is considered the final word in luxury possible in modern construction.

The axles are Timken, of course, and equipped with four-wheel, air-operated, metal shoe brakes providing the maximum in safety, ease of operation and brake-lining life. The powerful six-cylinder motor makes possible a speed of 60 m.p.h., although the maximum speed permitted by those in charge of the coach is 35 m.p.h., in rural districts.

New Timken-Detroit vehicle on country-wide tour

## 100 New Cars Likely for Detroit

Despite the defeat of the paving amendment, mentioned elsewhere in this issue, the Detroit Street Railway Commission, Detroit, Mich., will request the City Council for permission to purchase 100 new street cars to be constructed within the next year. It is estimated by Del A. Smith, general manager, that the new cars, of the Peter Witt type, can be constructed at a cost of $10,000 each or a total expenditure of $1,000,000. The original intention was to finance the new cars out of the savings of $700,000 a year which it was estimated would accrue to the system by relieving it of the paving charges.

## Specifications Announced for 201 Philadelphia Buses

Announcement has been made of the details of the 201 new gas-electric buses for the Philadelphia Rural Transit Company, Philadelphia, Pa., bus operating subsidiary of the Philadelphia Rapid Transit Company, delivery of which is expected to begin about May 1. The principal specifications of the equipment follow:

| | |
|---|---|
| Builder of chassis | Yellow Truck & Coach Manufacturing Company |
| Model | P.R.T. model "Z" |
| Builder of body | Yellow Truck & Coach Manufacturing Company |
| Seating capacity | Single-deck 33, double-deck 67, de luxe 27 |
| Weight (total) | 14,250 lb. |
| Length over all | 29 ft. |
| Wheelbase | 230 in. |
| Roofing material and headlining | Deck canvas and $\frac{1}{8}$-in. Haskelite |
| Brakes | Mechanical hand and foot |
| Buzzers | Electric Service Supplies Company |
| Destination signs | Hunter |
| Register | International R-10 |
| Heaters | Exhaust pipes |
| Builder of engine | Yellow Truck & Coach Manufacturing Company |
| Bore and stroke | $4\frac{1}{4}$ in. x $5\frac{1}{2}$ in. |
| Axle bearings | Timken |
| Interior lighting | Electric Service Supplies Company |
| Ventilators | Garland |
| Wheels | Budd |
| Tires | Goodrich pneumatic, 38x7 |
| Lubrication | Alemite |
| Ignition system | Northeast |
| Engine starter | Northeast |

### *Rolling Stock*

**Evanston Railway, Evanston, Ill.,** has placed orders for six modern cars to cost $12,000 each. It is expected the new equipment will be put in service within the next two months, bringing the total number of cars owned to nineteen.

**Macon Railway & Light Company, Macon, Ga.,** is planning to spend $314,000 in new equipment for its railway system following the granting by the City Council of its 10-cent fare petition. Specifications for the proposed equipment are now being drafted.

**Illinois Traction System, Chicago, Ill.,** has announced plans for an expenditure of nearly $50,000 for new rolling stock and equipment for its "through service" between Illinois Valley points and Chicago, according to a recent announcement of F. E. Fisher, general manager. Four of the one-man cars put in use a year ago are being made over at the Ottawa shops. The new route, service over which begins on May 1, will eliminate the transfer at Joliet.

### *Power Houses, Shops and Buildings*

**Public Service Railway, Newark, N. J.,** will build an extension to its carhouse shop building at South Orange Avenue, Newark, for a bus garage. This garage will have a capacity of about 45 buses and will house the buses of the South Orange Avenue line.

**Piedmont & Northern Railway, Charlotte, N. C.,** subsidiary of the Southern Power Company, has purchased from the city of Charlotte fourteen acres of land on which to build a modern passenger depot. This depot is in connection with the extension of the present electric line northward from Charlotte to Lexington, N. C., and southward from Gastonia, N. C., to Spartanburg, S. C. The price paid for the passenger station site was $46,500. The southern "missing link" between Spartanburg and Gastonia is considered one of the most important railway constructions announced in some time in this section.

**International Railway, Buffalo, N. Y.,** has announced a comprehensive plan to attract more business to Niagara Falls and to improve facilities at the Falls View Bridge, formerly known as the Upper Steel Arch Bridge. The work intended to be carried out will cost $75,000. The present bridge structure is adequate for many years to come, although there has been congestion at the American and Canadian ends. The principal difficulty has been experienced on rush days in the American exit, where a maximum of three automobiles per lane per minute has been passed by customs and immigration inspectors. The bridge structure itself will permit the flow of twelve automobiles per lane per minute, so that by enlarging the bridge ends the company will double the capacity of the structure. Detailed plans for improvement were submitted to the group. They provide for eight exit lanes instead of two as at present. A new and more comfortable office building will be erected for customs and immigration officials with canopies over the inspection platforms. Facilities will be provided for the parking of automobiles held for detailed inspection. Tracks now used by the cars of the Niagara Great Gorge trip will be relocated, thereby facilitating the movement of automobiles.

### *Trade Notes*

**General Insulate Company, Inc.,** has been acquired by Insulation Manufacturing Company, Inc., Brooklyn, N. Y., and will be continued as a department of the new owners under the same corporate name. With the merger of these two plants each company will continue to specialize in Bakelite and the various kinds of molded products and insulators.

**Chicago Fuse Manufacturing Company, Chicago,** announces that it has purchased the Powerlet line of rigid conduit fittings formerly manufactured by the Multi Electrical Manufacturing Company. The purchasing company will continue the manufacture of its present product, Gem and Union switch boxes, outlet boxes, fuses, electrical protective materials and other wiring devices.

**National Pneumatic Company** on April 15 will move its New York offices to the Graybar Building, 420 Lexington Avenue, New York. The Graybar Building, located in the heart of the Grand Central business section, is adjacent to the New York Central Railroad Terminal, and by subway connection to the Pennsylvania Railroad Terminal.

**Haskelite Manufacturing Corporation, Chicago, Ill.,** furnished its product, Plymetl, for the roofing of the new twin coach designed and built by Frank R. Fageol of Oakland, Cal. This new bus was fully described in the JOURNAL for Feb. 26.

**Textile Leather Company, Newark, N. J., and the Maumee Finishing Company, Toledo, Ohio,** have practically completed a merger which will result in the formation of the Textileather Corporation. Officers of the new corporation will be announced at an early date. Rumors announcing the closing of the Newark plant, according to a statement by the company, are entirely unfounded and the plant will continue to operate in the future as it has in the past. A new plant is nearing completion at Toledo which will supply the Western and Middle Western business and most of the automobile trade. The new corporation will be incorporated for $2,000,000 and there is no stock for sale. L. H. Green is at present acting as president of the Textileather Corporation and will continue to do so until new officers are elected.

### *New Advertising Literature*

**Ganz Electric Company, Ltd., Budapest, Hungary,** is celebrating its 40 years as a manufacturer of transformers by the issuance of a handsome historical booklet that not only features the various inventors that had a part in the establishing of the company but gives an exhaustive résumé of the Ganz transformers and where they have been installed. The booklet is illustrated with sepia engravings.

**Okonite-Callender Cable Company, Inc., Paterson and Passaic, N. J.,** is issuing a folder giving additional information for the users of Okonite tree wire.

**Lincoln Electric Company, Cleveland, Ohio,** has just issued its 1927 edition of the "Instruction Manual." This publication, which is revised annually to cover the latest practices used in manual electric arc welding, is of interest to practically overy one who uses arc welding. Among the subjects treated are high-speed steel welding, high-pressure pipe welding, automobile frames, boiler repairs, welding cast iron, manganese steel welding, carbon arc welding, manufacture of machinery and equipment using welded steel in place of castings.

**Condit Electrical Manufacturing Corporation, Boston, Mass.,** is featuring its Type N-4 safety switch by a humorous folder signed by "Safety Sam."

# Do Accidents Affect Net Revenue?

Accident claims, due to failures of inferior hand brakes in emergencies or during power interruptions, may not cut very deeply into net revenues, but it is a sufficient amount to justify steps being taken to eliminate such accidents.

## "Peacock" Staffless Brakes

Reg. U. S. Pat. Off

are like an insurance policy, protecting against inroads upon net income and accident reserves due to failures of hand brakes.

No matter how badly brake shoes are worn or how loose the brake rigging is, Peacock Staffless Brakes insure adequate braking power. In practice, test and experience, they have proved their merit beyond all argument or doubt. They pay for themselves.

May we furnish you with additional facts, figures and estimates?

The Peacock Staffless

**National Brake Company, Inc.**

**890 Ellicott Square** **Buffalo, N. Y.**

*Canadian Representative:*
Lyman Tube & Supply Co., Ltd., Montreal, Can.

# The Maintenance Sheet Tells the Story

The company who furnished this information operates 400 busses.

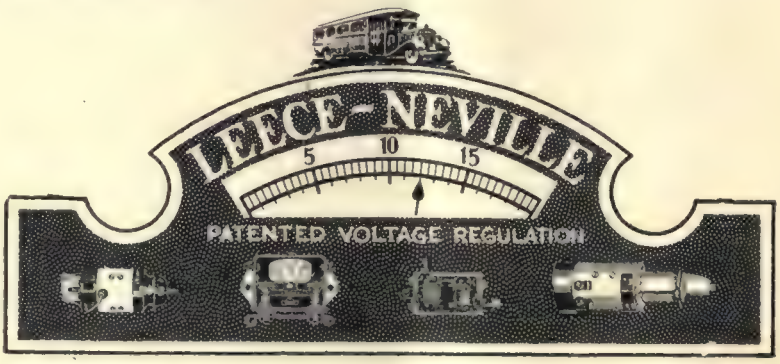
They know what they're talking about.

**MEMORANDUM**

For your information. Maintenance sheets show maintenance costs on electrical equipment are lower than on any other part of the bus, or for any other type of equipment.

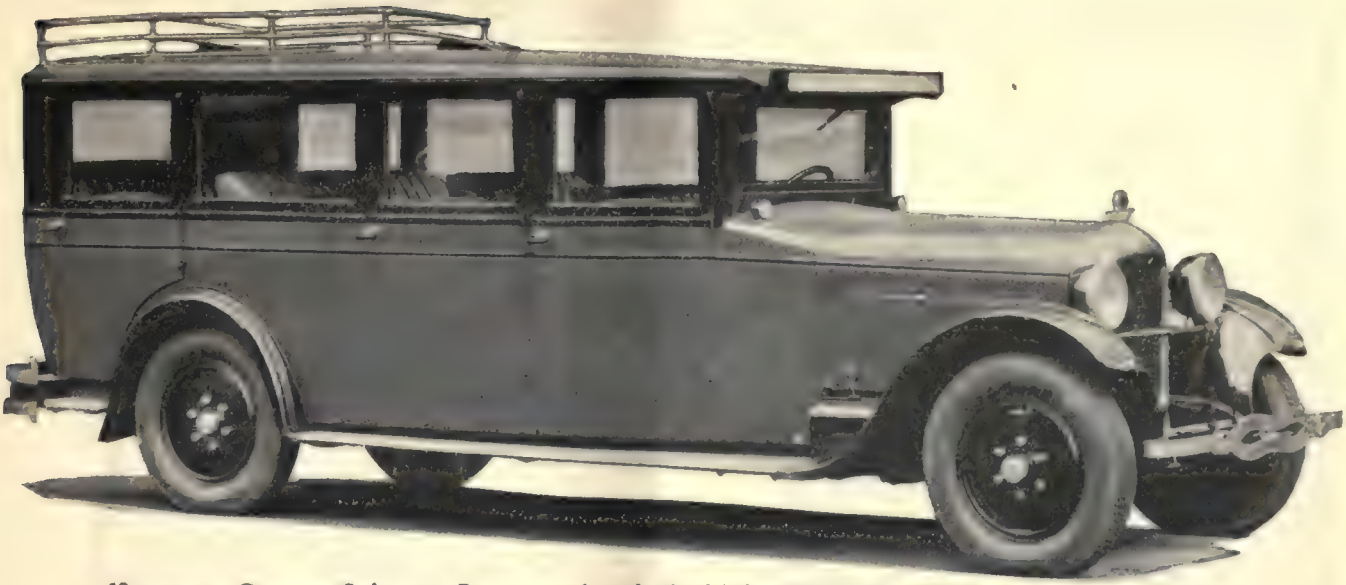
**Many trucks and busses, Leece-Neville equipped, have run 125,000 miles without removing batteries for any repairs.**

**This service is available for you. Why not have it? And prolong battery life.**




## The Leece-Neville Co.

**5353 Hamilton Ave., Cleveland, Ohio**



12-passenger Cross-seat Sedan-type Bus mounted on the Studebaker 158-inch Chassis. Price $3785, f. o. b. factories

*Sedan and parlor type bodies up to 15-passenger capacity are available on the same chassis. Studebaker also builds a 184-inch chassis, which accommodates 15-18 passenger bodies for highway work and a special 21-passenger street car type for city service*

# More profit per passenger mile with this NEW-TYPE Bus

IN a recent nation-wide investigation of operating costs and practices in the bus business, Studebaker found that *the medium-capacity bus of low first cost and low operating cost invariably gives more profit per passenger mile.*

The New Studebaker Bus Chassis is therefore built in the two sizes proved to be most profitable: (1) 158-inch wheelbase for 12 to 15-passenger bodies, and (2) 184-inch wheelbase for 18 to 21-passenger bodies.

Due to standardized design and volume production in the great Studebaker plants, first cost is remarkably low — the medium-capacity Studebaker Chassis with body complete *sells for half the price of a large-capacity bus.*

Operation costs are equally low in comparison. Records show that the Studebaker bus, operating under the identical conditions of the average large-capacity bus, is *40 per cent lower in actual vehicle operation and overhead cost.*

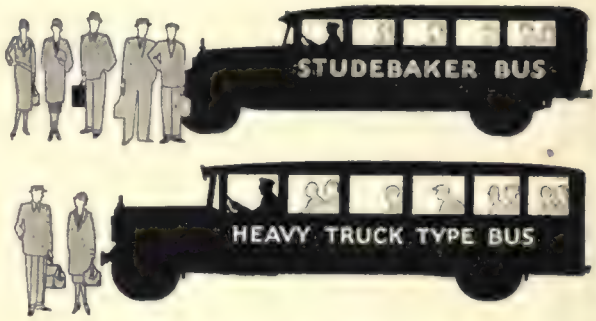
Thus with one-half the initial and operating cost, the bus operator can purchase and operate two Studebaker busses for the same outlay as one large-capacity bus. The auxiliary bus is available for conventions, outings and other special service. Further, in case of accidents, the operator with an extra bus suffers no loss through interrupted service.

These advantages which result in increased profit per passenger mile apply in equal ratio to the fleet owner as to the individual operator.

## Outstanding Features

1. *75-horsepower, 6-cylinder Studebaker Big Six L-head engine.*
2. *Staunch channel steel frame, tied by 8 stout cross-members.*
3. *Extra large rear axle shaft of chrome Molybdenum steel, 2¼ inches in diameter.*
4. *Sturdy, resilient springs of best grade Vanadium steel.*
5. *Low hung frame provides safety and comfort in riding; easy entrance and exit for passengers.*
6. *Over-size propeller shaft, held rigid by a ball-bearing steady rest.*
7. *Powerful hydraulic brakes operating on four wheels, supplemented by service brake on rear wheels and emergency brake operating on drive shaft.*

# STUDEBAKER BUS CHASSIS




*Due to its low initial and operating cost, the Studebaker Bus Chassis under average conditions, requires only 5 passengers to pay operating costs. The large capacity truck-type bus requires 8 passengers. Since the average load is 10 passengers, it will be seen that the Studebaker Bus carries 5 profit-producing passengers as against only 2 passengers carried at a profit by the larger type bus.*

Get full particulars of the new Studebaker Bus Chassis. Mail the coupon below—and obtain free a copy of our unique booklet, "Profitable Bus Operation." It gives facts and figures of vital interest to every bus owner.

The Studebaker Corporation of America,
Dept. B, South Bend, Ind.

Send me free "Profitable Bus Operation" without obligation.

Name .....

Address .....

City ..... State .....

How many busses have you at present? .....

What kind? .....

# Keeping 'em on the Road

Every idle bus hour makes a leak in earnings that is difficult to mend. And idle hours are sure to follow when sediment bridges across the bottom of the plates. Saving bus hours was fully considered when the Willard Bus Battery was designed.

T. A. Willard

Note the difference in the sediment space in the cell shown at the left and the cell of a Willard Battery shown at the right. This extra sediment space is one of the features that keeps Willard Batteries on the road delivering uninterrupted service month after month.

WILLARD STORAGE BATTERY COMPANY
CLEVELAND, OHIO

# Willard Batteries

# DURBAN, *South Africa*

THE mail boat "Kenilworth Castle," arriving at Durban, Natal, South Africa, from England, is met by two conveyances from the Marine Hotel. The International Motor Coach and the low, swift truck built by International to the highest standard, make many trips weekly to the docks at the port and meet twelve trains daily coming over the South African Railways.

Managing Director Joel of the Marine Hotel is an enthusiast on the subject of International Motor Coaches, and so are a multitude of owners closer home and the world around. International Harvester offers the operator this quality coach at low cost. The inviting interior holds perfect comfort for 15 passengers in the Club Coach and for 17 in the Sedan-type Coach. Distinctive lines, easy riding features, and all-around economy recommend this unit for every passenger transportation enterprise. Service through 125 Company-owned branches in the U. S. *May we send detailed information?*

INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. of America (*Incorporated*) Chicago, Illinois

# INTERNATIONAL *6-cylinder* Coaches

# *Interurban Transportation today has unusual upkeep problems*

WHETHER you have extended your lines with busses or not, your shops have one constant maintenance factor—bolts and nuts.

The electric traction end of it requires constant attention. The quality of bolts and nuts must be high if frequent replacements are to be avoided.

With the motor bus the same holds true with greater emphasis, as the strains and stresses of bus travel necessitate frequent overhaul.

See that your shops use only Empire *New Process* Bolts, with their threads of gauge-like accuracy and their high tensile strength.

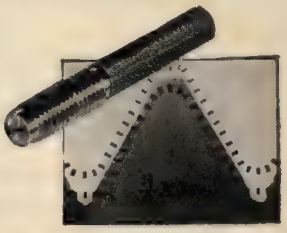
*Samples for testing on request.*

**RUSSELL, BURDSALL & WARD BOLT & NUT COMPANY**
PORT CHESTER, N.Y.

Branch Office Straus Building CHICAGO — Branch Office General Motors Bldg. DETROIT — Branch Factory ROCK FALLS, Ills. — Strangle & Gillette 169 Jackson Street SEATTLE — Maydwell & Hartzell, Inc. 156-168 Eleventh Street SAN FRANCISCO

Makers of Bolts, Nuts and Rivets Since 1845

*This is the thread profile of an Empire New Process Bolt as projected by the screw thread comparator.*



*This is the thread of a hardened and ground gauge as projected by the screw thread comparator.*

# EMPIRE New Process BOLTS

over 80,000 lbs. tensile strength

Baker
Raulang
BUS
BODIES
RIDING comfort, added seating capacity, long life, low upkeep cost, are a few of the many *provable* advantages of Baker-Raulang Bus Bodies—the result of 73 years of body-building experience.
A full line is offered, varying from 17 to 29-passenger capacity, designed for city, surburban and parlor car service.
Descriptive bulletins gladly sent on request.
THE BAKER-RAULANG COMPANY
Bus Body Division
CLEVELAND, OHIO

LOW MAINTENANCE
AFTER your pole line has been in service six or seven years—what do you have, replacements or profit? It's the number of renewals, the maintenance cost, and the line strength after five, ten, twenty and thirty years that determine the return on your pole line investment.
Biggest returns are obtained from Creosoted Pine Poles. They have greatest strength and this strength is permanent. As a result, they have longest life, lowest percentage of renewals, stand up during all kinds of storms and have lowest maintenance. Creosoted Pine Poles are so reliable, that frequent inspection is unnecessary—an important factor in further reducing maintenance costs.
Illustration shows International Creosoted Pine Poles in the Pueblo-Canon City Transmission Line, Southern Colorado Power Company.
International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont
2¢7
The International Dating Nail
International
Creosoted Yellow Pine Poles

# "STANDARD" STEEL PARTS

*Look for this mark* ⚓S⚓ *of Standard Quality on*

*Steel Axles Steel Springs*
*Armature Shafts*
*Rolled Steel Wheels*

# FALLING IN LINE WITH PROGRESS

PROGRESS in the Electric Railway Industry is marked by constant improvement in equipment and constant lowering of costs. In rehabilitation of old cars as well as in construction of new cars, "Standard" Steel Wheels, Armature Shafts, Axles and Springs will assure the most immediate improvement and the greatest ultimate economy.

## STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
ST. LOUIS
NEW YORK

HOUSTON, TEXAS
PORTLAND, ORE.
RICHMOND, VA.

SAN FRANCISCO
ST. PAUL, MINN.
PITTSBURGH, PA.

WORKS: BURNHAM, PA.

JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

"MILLIONS FOR MODERN CARS" is now a slogan in the industry. Managements are all talking about replacing the obsolete rolling stock with new, attractive, speedy and comfortable cars.

But if these modern cars are to win back a lucrative passenger traffic for the railways, they must at least be given a fair chance to show their good points. Rough track, with cupped or broken joints will not afford a smooth or fast, or quiet ride no matter how fine the car itself may be.

Millions for modern cars is a good slogan but add a few thousands for Thermit-welded track this Spring. Thermit welding eliminates the joints, making a continuous rail on which cars can operate faster, more quietly and smoothly.

**Old track can be saved for satisfactory service for many years by THERMIT-WELDING. Let us show you how!**

THERMIT

THERMIT

**METAL & THERMIT CORPORATION**

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

# *Renew* your old track *for the last time*—

Track renewal with wood ties is only a temporary improvement. The use of steel ties however, means a permanent track foundation. Temperature variations, water and decay do not affect Carnegie Steel Ties. This is proved by the excellent condition of these ties uncovered for rail renewal after 18 years in heavy duty service.

The illustration shows an inexpensive renewal job. Wood ties set in concrete had been formerly used. After eleven years service, steel ties were substituted, using the old concrete base.

For real economy, renew your old track for the last time with Carnegie Steel Ties. They guarantee lower costs per mile per year.

Booklet—"Steel Cross Ties"—on request.

# CARNEGIE STEEL COMPANY

**General Offices • Carnegie Building • 434 Fifth Avenue**

**PITTSBURGH PENNSYLVANIA**

The immaculate trimness and the luxurious appointments of Lang Bodies produce a delighted anticipation of a comfortable trip ahead!

LB

The Sterling Mark on Bus Bodies

# LANG BODIES

*create new passengers*

The signal to stop is made with regret—in a Lang Body.

Passengers in this mood ride often. They tell others about the route. Revenue is increased.

By studying every requirement for passenger comfort and combining luxurious appointments with sturdy construction, Lang not only creates new passengers but adds many miles to body life.

THE LANG BODY COMPANY
CLEVELAND, OHIO

*"After all— it's the Setting that counts!"*

*For Modern Car Upholstery you can't do better than*

plush

# Plush *always looks clean and is easiest to keep clean*

Fifty thousand tiny erect "hairs" in every square inch of genuine Massachusetts Mohair Plush pile! Each is separate, tough, springy and smooth in texture. Dust will not adhere to these. It sifts down to the base, whence it can easily be removed with a vacuum cleaner.

That is why plush always looks clean, and why it is the easiest of all car seat materials to *keep clean,—really clean.*

Passengers prefer plush because it does not soil their clothes. Operators prefer it because it looks better longer,—and usually outlives the car itself.

The latest genuine Massachusetts Mohair is all that could be desired in up-to-the-minute upholstery for every type of car.

Quotations and samples on request.

MASSACHUSETTS MOHAIR PLUSH CO.

Main Office
200 Devonshire Street, Boston, Mass.
Makers of BAY STATE PLUSH

New York Agent:
Sisson Supply Co.
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Western Agent:
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1822 McCormick Building
Chicago, Illinois

# MASSACHUSETTS MOHAIR PLUSH

*The railroad standard for over 35 years*

# *Quick Installation At Low Cost!*

Type AFT-2 Arc Weld Bond, Installed

*Isn't that what you want?*

Extra heavy steel terminals permit the use of large welding rod and large welding currents. Quick installation at low cost is what you get with Erico Type A F T-2 arc weld bonds.

As plus features the big copper "U" loop gives great flexibility.

The stranded copper cable eliminates destructive vibration—even the passing of high speed trains doesn't injure it. And the great strength of the weld assures permanent terminal contact.

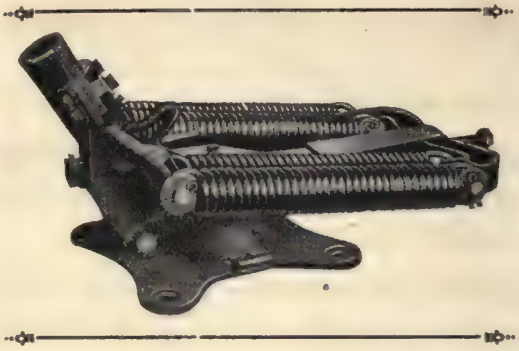
What more can you ask of a rail bond?

*Details upon request.*

## The Electric Railway Improvement Co.

2070 E. 61st Place Cleveland, Ohio

# Do You Think You Could Build a Nuttall Trolley?



You doubtless could if you knew what grade of metal to put in the foot, the swivel, the pole socket, etc.—if you knew where they had to be reinforced to withstand strains and where they had to be lightened to keep down weight; if you knew a reliable foundry that could furnish suitable castings; if you had $60,000 worth of special machinery, tools, jigs, reamers, drills, etc., but even so, if you didn't have 35 years of experience and a crew of skilled mechanics you couldn't *equal* a Nuttall Trolley. So why should you think anyone else could?

Why should you buy just trolley poles, trolley harps, trolley wheels? If they cost less than Nuttall's its poor economy anyhow because they are worth less. And it is worth something *more* to get with your purchase the feeling of confidence inspired by a product you know is *right*.

***Buy genuine Nuttall Trolley parts, poles, wheels, harps, from Nuttall.***

## R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

MEMBER AERA 1927

THE Duff Governor-Controlled, Self-Lowering Jack shown above is one of the most important lifting Jack developments within the past fifty years.

It is the ONLY jack on the market that employs the Governor Principle—the ONLY self-lowering jack that is absolutely under control of the operator at every moment, or that can be stopped instantly at any point without danger to jack or load.

This jack, in 15-ton capacity, renders a safe and quick service for general lifting duty. Here is a one-man, high-speed jack which handles lifting jobs under every condition with greater speed, safety, and ease than any other jack in existence.

Available also in 25-, 35-, 50-, and 75-ton capacities, all with a generous margin of safety above rated capacities. And as in all DUFF Jacks, simplicity of design, excellence of workmanship, and quality of materials combine to the virtual elimination of maintenance cost. You'll find every DUFF Jack a powerful and profitable servant. Write for detailed information.

*DUFF Jacks are GOLD MEDAL Jacks—awarded the Gold Medal (highest award) at the Sesqui-Centennial Exposition in Philadelphia, 1926; also at St. Louis, 1904; Portland, Oregon, 1905; Buenos Aires, 1910—each time in competition with the World.*

THE DUFF MANUFACTURING COMPANY, Pittsburgh, Pa.

Established 1883 Cable Address "Leverjack"

NEW YORK ST. LOUIS CHICAGO SAN FRANCISCO ATLANTA HOUSTON

DUFF JACKS

# Advance Notice!

*An Announcement of the utmost importance to the Electric Railway Industry will be made in this Journal, in the near future by the*

VERSARE CORPORATION
*Albany, New York*

# BUFFALO
## *Hand-Holds—*

are a necessity! Without them great difficulty is experienced by passengers attempting to walk through cars. They create better public relations!

They will not stain the hands, and the riding public, which shuns anything soiled, is pleased with this feature. This also helps to improve good will!

And they are moderately priced. *Investigate.*

CENTRAL EQUIPMENT COMPANY
*800 Englewood Ave., Buffalo, N. Y.*



# COLUMBIA

**Railway Supplies and Equipment**

Machine and Sheet Metal Work

Forgings Special Machinery and Patterns

Grey Iron and Brass Castings

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*The*
Columbia Machine Works
*and M. I. Co.*
265 Chestnut St., corner Atlantic Ave., Brooklyn, N. Y.



# Griffin Wheel Company

410 North Michigan Ave.
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# Griffin Wheels

## with Chilled Rims and Chilled Back of Flanges For Street and Interurban Railways

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| Chicago | Boston | St. Paul |
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# How to build radio sets

## —and service them in operation

Do you want to know how to build yourself a late model radio set?

Do you want to know how to improve your radio set?

Do you want to know how to test your set, how to locate troubles and how to repair your set?

Do you want to give radio service to others?

This new book—just out—gives you the practical information you want about constructing and repairing all kinds of radio receiving sets.

Moyer and Wostrel's

## PRACTICAL RADIO CONSTRUCTION AND REPAIRING

**319 pages, 5 x 8, illustrated, $2.00**

This new book gives you a practical explanation of radio construction and repair that will be valuable to you in operating your own set or in giving radio service to others.

It starts in with radio fundamentals and takes you step by step through every important radio detail up to the latest types of eliminators and chargers. Plain instructions for construction. Plain instructions for connecting and testing. Plain instructions for repair. Get this specialized information. It will mean a lot to you in getting more enjoyment and money out of radio.

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**McGRAW = HILL**

**FREE EXAMINATION COUPON**

McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York.

You may send me on 10 days' approval, Moyer and Wostrel's RADIO CONSTRUCTION AND REPAIR, $2.00 net, postpaid. I agree to remit for the book or to return it postpaid within 10 days of receipt. (To secure books on approval write plainly and fill in all lines.)

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E.R.J. 4-9-27



# FOR SAFETY FROM FIRE INSTALL THE

IMPROVED Pyrene TRADE MARK FIRE EXTINGUISHER

Safety demands that every car or bus be equipped with a Pyrene Fire Extinguisher. The riding public expect and are entitled to the protection from fire which this extinguisher assures.

Aside from the protection from fire afforded by such installation, to both rolling stock, operator and passengers, the schedule of the Central Traction and Lighting Bureau specifies a charge of 5¢ on motor buses, 3¢ on interurban and 1¢ on urban cars, for the absence of fire extinguishers.

The slight outlay involved by having rolling stock equipped with an Improved Pyrene (one-quart) Fire Ext nguisher should be regarded as an investment—a device that helps make safety from fire certain should be popular.

Safety adds to the revenue of the operating company by inspiring confidence in the riding public toward modern transportation.

Many of the leading Public Service Corporations recognize this and have equipped their cars and buses with Pyrene Fire Extinguishers—they know a burning car or bus need not be abandoned if a Pyrene Fire Extinguisher is at hand.

For the protection of electrical equipment, power houses, car barns, shops and storerooms Pyrene (1½ quart) Fire Extinguishers are dependable in every emergency.

PYRENE MANUFACTURING CO.
NEWARK, N. J.

*"Fortify for Fire Fighting"*

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Incorporated
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PHILADELPHIA CHICAGO SAN FRANCISCO

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Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
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TRANSPORTATION SURVEYS
Organized Traffic Relief and Transit Development
Co-ordinating Motor Transport, Railroad and City Plans, Service, Routing, Valuation, Economic Studies
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# THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

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LOS ANGELES, Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

THE P. EDWARD WISH SERVICE

50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Our advertisement in the issue of March 19 showed how

# HASKELITE and PLYMETL

are helping many leading operators to cut down operating costs. Haskelite has been specified on a recent order for the Indianapolis Street Railway, Indianapolis, Ind.

*Another ad will appear next week.*

HASKELITE MANUFACTURING CORPORATION
133 W. Washington St., Chicago, Ill.

# BATES EXPANDED STEEL POLES

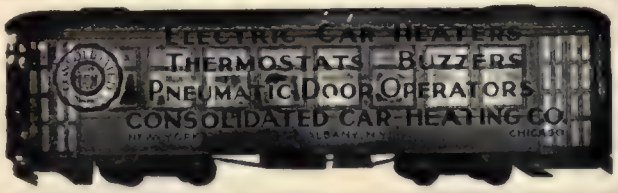
*TOWERS — SUBSTATIONS*

BATES EXPANDED STEEL TRUSS COMPANY
*General Offices and Plant, East Chicago, Indiana*

Hale and Kilburn SEATS

Better Quality Seats For Cars and Buses

Hale-Kilburn Co.
1800 Lehigh Ave., Philadelphia, Pa.




Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

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Engineers and Contractors — SYRACUSE, N. Y.

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HYDROGEN
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Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.

International Oxygen Co., Main Offices: Newark, N. J.
Branches: New York Pittsburgh Toledo

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RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD
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Cleveland, Ohio.

Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois

THE WORLD'S STANDARD

# "IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irv-O-Slot Insulation — Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

*Sales Representatives:*

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Prehler Brothers Inc., Chicago
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Whatever your requirements

specify

Le Carbone Carbon Brushes

They talk for themselves

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Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
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MORE-JONES TROLLEY WHEELS AND HARPS

WE MANUFACTURE various types of trolley equipment. The quality of metal, conductivity, resistance to friction, effect on overhead, shape and size of wheel groove, have all been carefully worked out and perfected. In addition to the highly specialized V-K Oilless Trolley Wheels and Harps, More-Jones make the most complete line of lubricated trolley wheels and harps to meet all requirements. Let us quote you.

More-Jones Brass & Metal Co.
St. Louis, Mo.

MORE-JONES QUALITY PRODUCTS

"Opportunity" Advertising:
Think "*SEARCHLIGHT*" First!

## LEGAL NOTICE

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of Electric Railway Journal, published weekly at New York, N. Y., for Apr. 1, 1927.

State of New York }ss.
County of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared C. H. Thompson, who, having been duly sworn according to law, deposes and says that he is the Secretary of McGraw-Hill Publishing Company, Inc., Publishers of Electric Railway Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, McGraw-Hill Publishing Company, Inc., 10th Ave. at 36th St., New York, N. Y. Editor, Charles Gordon, 10th Ave. at 36th St., New York, N. Y. Managing Editor, Morris Buck, 10th Ave. at 36th St., New York, N. Y. Business Manager, L. F. Stoll, 10th Ave. at 36th St., New York, N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) McGraw-Hill Publishing Company, Inc., 10th Ave. at 36th St., New York, N. Y. James H. McGraw, 10th Ave. at 36th St., New York, N. Y. James H. McGraw, Jr., 10th Ave. at 36th St., New York, N. Y. Donald C. McGraw, 10th Ave. at 36th St., New York, N. Y. Harold W. McGraw, 10th Ave. at 36th St., New York, N. Y. Curtis W. McGraw, 10th Ave. at 36th St., New York, N. Y. James H. McGraw, James H. McGraw, Jr., and Malcolm Muir, 10th Ave. at 36th St., New York, N. Y., Trustees for: Harold W. McGraw, James H. McGraw, Jr., Donald C. McGraw, Curtis W. McGraw. Henry W. Blake, 10th Ave. at 36th St., New York, N. Y. Fred R. Low, 10th Ave. at 36th St., New York, N. Y. Mason Britton, 10th Ave. at 36th St., New York, N. Y. Anne Hugus Britton, McGraw-Hill Bldg., New York, N. Y. Grace W. Mehren, 30 West 38th St., New York, N. Y. Malcolm Muir, 10th Ave. at 36th St., New York, N. Y., Trustee for Lida Kelly Muir. Fred S. Weatherby, 271 Clinton Road, Brookline, Mass. Edwin S. Wilsey, 10th Ave. at 36th St., New York, N. Y. Edgar Kobak, 10th Ave. at 36th St., New York, N. Y. James L. Walsh, 10th Ave. at 36th St., New York, N. Y. Leonard D. & Arthur J. Baldwin, 27 Pine St., New York, N. Y., Trustees for: Franklin Baldwin, Grace Riker, Cynthia Hazelton. Arthur J. & Leonard D. Baldwin, 27 Pine St., New York, N. Y., Trustees for: Donald Baldwin. The Grosvenor, Inc., stockholders of which are Arthur J. & Leonard D. Baldwin, Inc., 27 Pine St., New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

McGRAW-HILL PUBLISHING COMPANY, INC.
C. H. THOMPSON, Secretary.

Sworn to and subscribed before me this 22nd day of March, 1927.

[Seal.] MARTIN J. WIEMER.
Notary Public Queens County Certificate No. 1819. Certificate filed in New York County No. 272.
(My Commission expires March 30, 1928.)

# SACRIFICING USED RAILWAY EQUIPMENT

**BIRNEY CARS**
4—32 seating capacity, Westinghouse 508-A motors, fully equipped. Splendid condition.

**SOUTHERN CARS**
5—Double truck, 42 passenger. One man operation.

**SWEEPERS**
1—Double truck snow sweeper, fully equipped.
1—McGuire single truck snow sweeper, fully equipped.

**BUSSES**
2—Studebaker, Parlor Car, 15 passenger. Year 1926. In good condition.

All of this equipment is in excellent condition and presents a buying opportunity that enables you to secure equipment for which there is an everyday need, at prices that mean great savings.

*Write or wire for our prices.*

*We purchase railways in their entirety and are especially equipped to do our own dismantling.*

*Send us details of what you have and we will arrange to make an inspection and give you our best proposition.*

**TOWER TRUCK**
1—2½-3-ton White Tower Truck McCardle three section tower, electric starter and lights. Fully equipped. New 1923.

**WELDING MACHINE**
1—Railway Welding & Bonding Company. New 1923. Fully equipped.

**POLES**
100—Three section tubular steel poles. In good condition.

**MOTORS**
24—Westinghouse 307's.

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FIRST-CLASS draftsman, familiar with steam and electric car truck design and manufacture. Answer stating age, experience and salary expected. P-988, Electric Railway Journal, Tenth Ave. at 36th Street, New York.

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AUDITOR, office manager, accountant, high class man of executive type, qualified by successful experience with large organizations; particularly trained in street railway work; available on short notice; correspondence invited. PW-985, Electric Railway Journal, 1600 Arch St., Philadelphia, Pa.

MASTER mechanic of character and ability, 20 years' experience on city and interurban property, desires to make a change for personal reasons. Best of references, correspondence solicited. PW-993, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

MAINTENANCE of equipment on buses, city and interurban electric cars. I have been very successful in showing low cost per mile with minimum number of car failures, desire for personal reasons to make a change, correspondence solicited, confidential. PW-990, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

MOTOR coach or railway executive. Experienced in organization, operation and maintenance, route surveys, prediction of earnings, analysis of operating costs, preparation book of operating costs, operators bonus system, installation of standard accounting system and arrangement of efficient schedules. Rehabilitation of properties, passenger and freight tariffs. Known selection of proper equipment to assure most economical operation. Now employed, but seek opportunity for past successful methods to produce relatively greater results. Available on short notice. A-1 references. University graduate. Thirty-eight years old. Correspondence solicited. PW-989, Electric Railway Journal, 1600 Arch St., Phila., Pa.

MR. MANAGER. If not satisfied with revenue, operating costs, efficiency and co-operation of employees and general conditions, a reply to this advertisement will put you in touch with a superintendent of transportation capable of producing results you desire. PW-992, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

PRESENT manager of street railway property in Middle West operating 70 cars and 65 buses, desires change for personal reasons. Forty-five years of age. Twenty years' practical experience. Correspondence solicited. PW-987, Electric Railway Journal, Bell Telephone Building, St. Louis, Mo.

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SITUATION wanted as purchasing agent or executive assistant, eight years railway storekeeper, ten years lighting and railway purchasing, also general electric railway experience. PW-984, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

SUPERINTENDENT transportation available; broad experience, fine record, city and interurban properties, co-ordination rail and bus, recognized ability, credited with building up one of the most loyal and efficient organizations in Central West and placing property on paying basis, progressive, efficient, a hustler, capable of getting results. Fine references, correspondence and interviews invited. PW-991, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

UTILITIES executive available. Engineering graduate, broad operating and executive experience, railway, also light and power. Young and progressive with tried and proven ability. Railway activities known to the industry. At present employed; seek opportunity with larger interests. The opportunity for past successful methods to produce relatively greater results. PW-972, Electric Railway Journal, Tenth Ave. at 36th St., New York.


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(Continued on page 48)

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(Continued on page 51)

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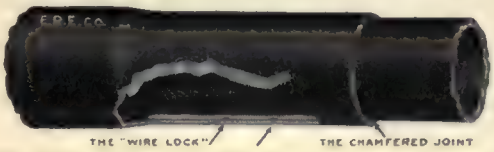


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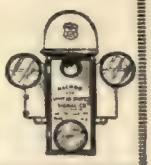

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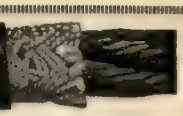

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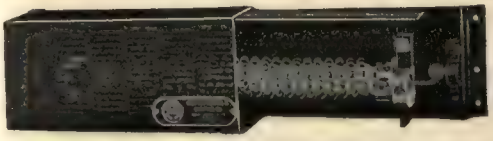

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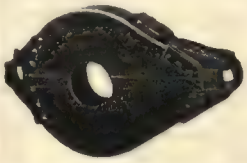

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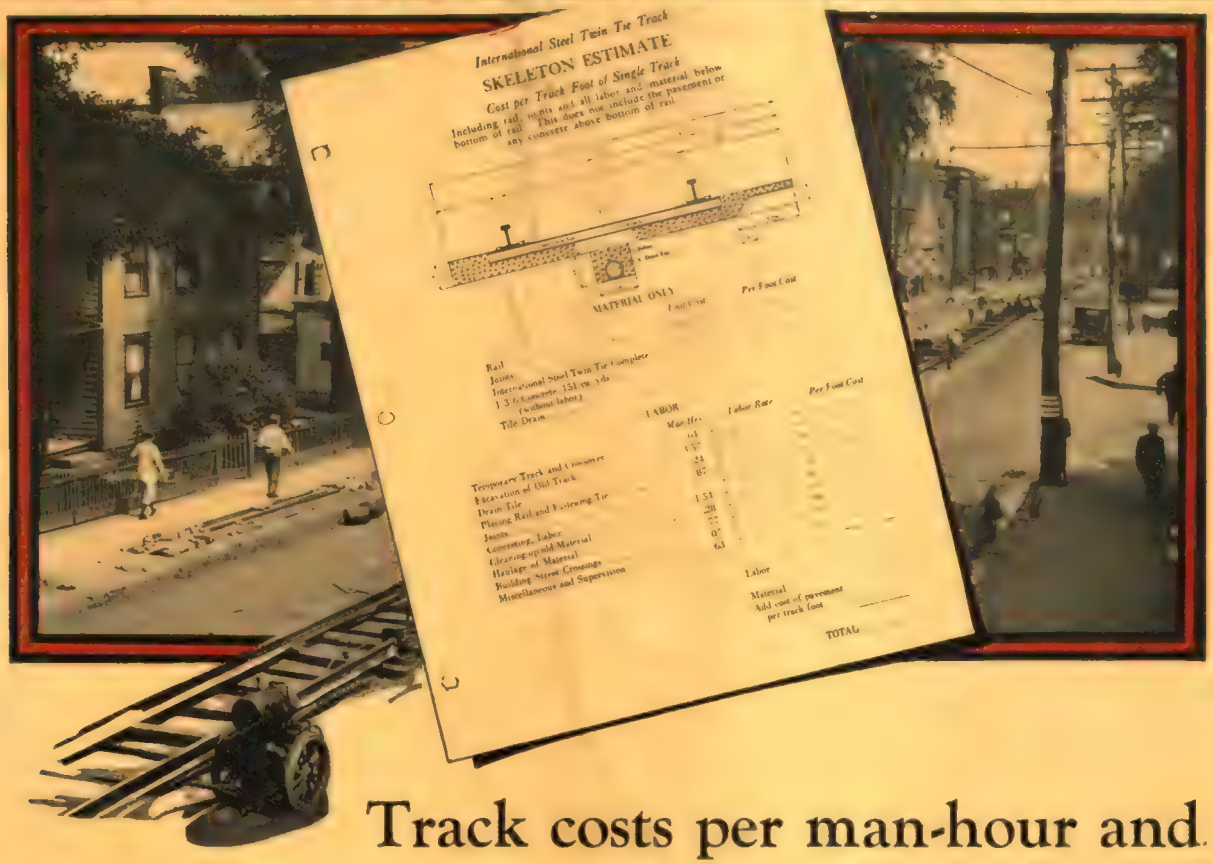


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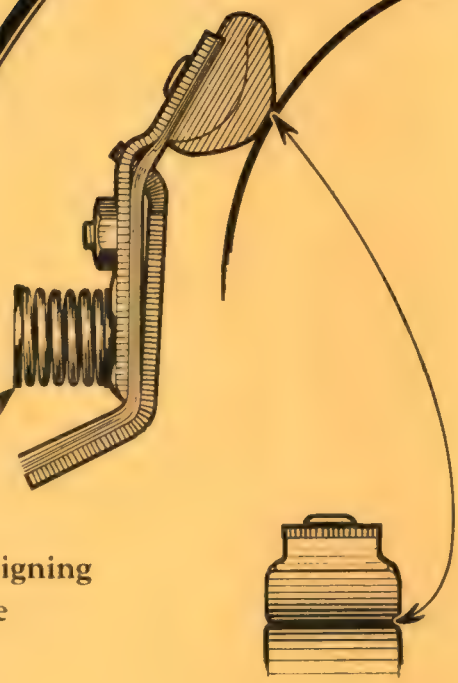
# Steel Twin Tie Track

# Maximum Contact Always!

WESTINGHOUSE ELECTRIC




## *Compensating Fingers*

are self-aligning. Regardless of the contour of the controller drum surface, Westinghouse compensating fingers automatically adjust themselves to the position of maximum contact; they automatically provide an adequate contact area, within the capacity of the controller, to prevent heating or burning.

Study the illustration at the left; under the constant pressure of a long-lived *coil* spring the finger finds its own position. There can be no one-spot contact to heat or burn, even on badly worn controllers.

Ask the Westinghouse salesman for further information and prices.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in all Principal Cities of the United States and Foreign Countries

MEMBER ELECTRIC RAILWAY ASSOCIATION AERA 1927

# Westinghouse

X88899

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# ELECTRIC RAILWAY JOURNAL

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*Vol.* 69
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## *Your Professional Shopper*

EASTER shopping is women's prerogative. Witness her Paquin coat, Chanel frock and new-style cloche. Joy on earth for her at this season means to buy and let buy with little regard for the day of reckoning. In the flush of Easter adornment, the bargain instinct which usually serves to guard, guide and glorify the shopper is disregarded. Thus the buying flood carries prices up to a sharp seasonal peak.

Demand in the railway field is seldom seasonal. In this industry, prices do not fluctuate 25 or 50 per cent before and after a holiday. But the costs of basic materials over a period do show distinct trends and variations.

Each week ELECTRIC RAILWAY JOURNAL supplies the railway operator with a table of metal, coal and material prices, supplemented in the third issue, namely the Monthly Maintenance Issue, with data more varied and more extended. The alert manager and his purchasing agent will study the contents of these pages over a period of months, but unlike the Easter shopper will anticipate and avoid seasonal premiums.

This market page, if preserved in file form, will serve as an indicator to the observer of price trends, as a guide to the buyer of materials and as a valuable aid to economy in the year's operations.

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MEMBER ELECTRIC ASSOCIATION AERA 1927

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*Industrial Engineer*
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*Successful Construction Methods*
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*(Published in San Francisco)*
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*(Published in London)*

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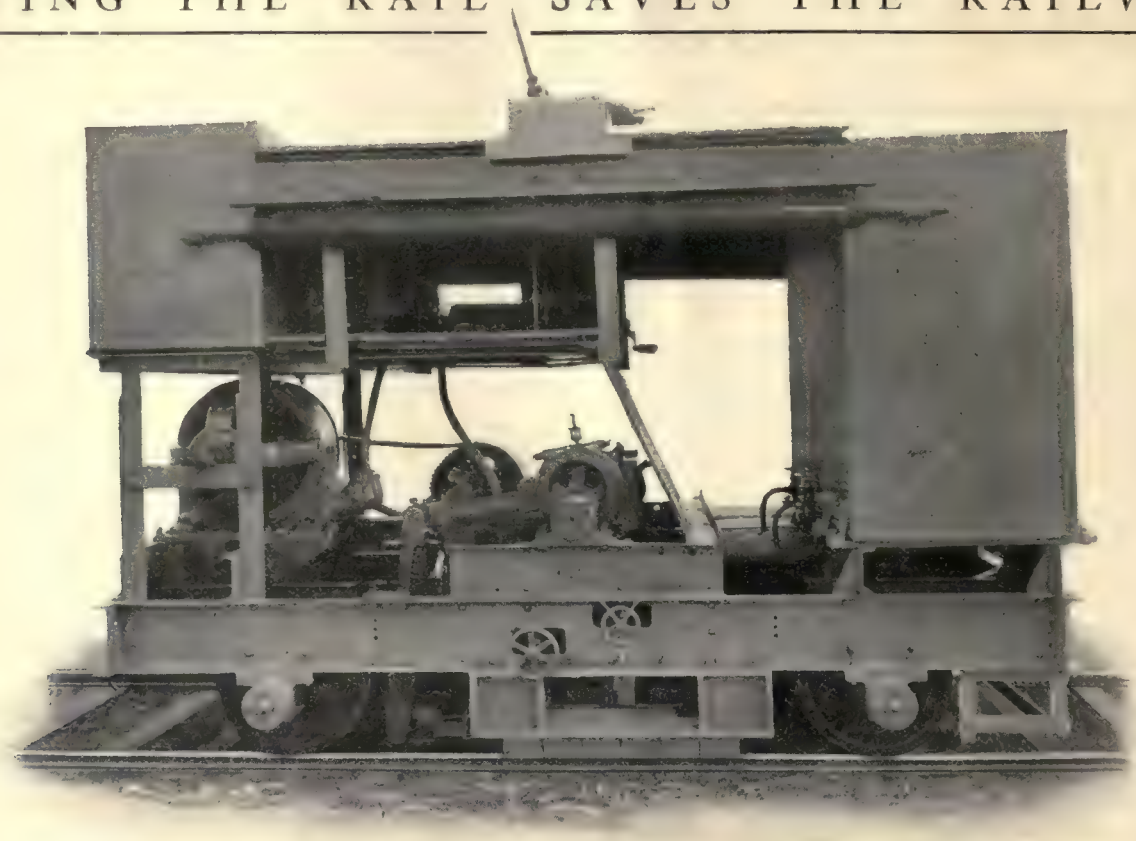
SAVING THE RAIL SAVES THE RAILWAY



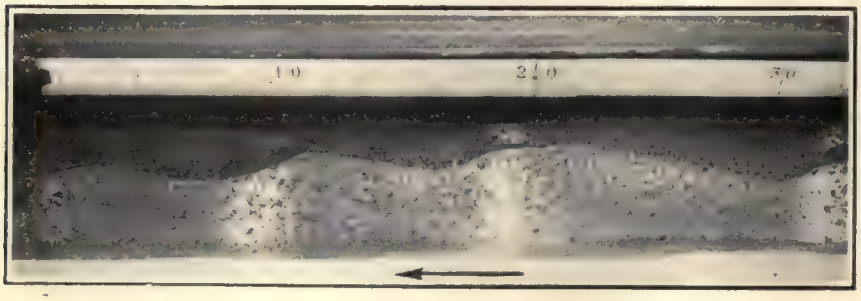
# Beware of Undulatory Wear *alias* corrugations:

The whole world is researching the rail corrugation problem.

Some day we'll all know all about this phenomenon. We already know how corrugations play hob with track foundations and rolling stock. We know that there is no infallible preventive that fits all cases. We know too that there is only one economic cure—constant grinding.

It's far cheaper to keep grinding out rail corrugations than it is to do nothing toward removing them.

And the only way to grind them out and restore true rail contour is by rubbing abrasive bricks back and forth over the rail until the undulations have been removed completely. Completeness of removal is essential.



For such eradication of the evil, there never has been a more effective tool than the Reciprocating Grinder.

This old standby (used all over the world) and its new big brother the 20,000 pound heavy duty reciprocating grinder will remove corrugations for less money per foot removed than any other means ever used. And cost per foot of actual corrugations completely removed is the only sensible basis for figuring.

*A word from you brings complete details and a quotation.*

**Railway Trackwork Co.**

3132-48 East Thompson Street, Philadelphia

AGENTS

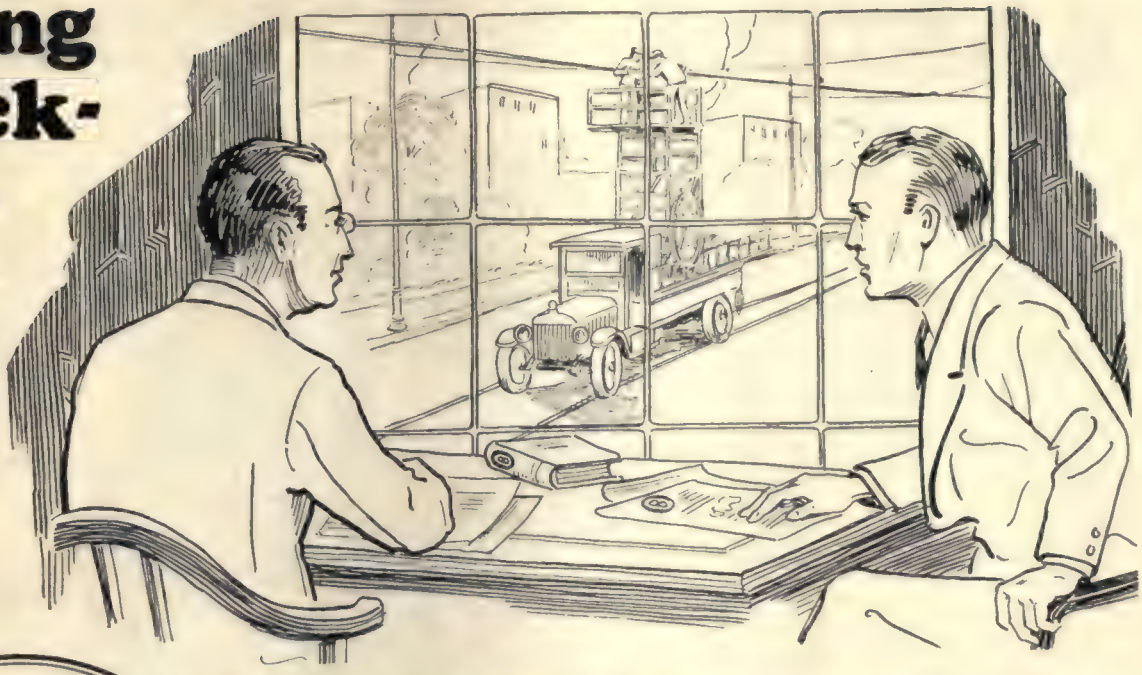
Chester F. Gallor, 30 Church St., New York
Chas. N. Wood Co., Boston
Electric Engineering & Mfg. Co., Pittsburgh
H. F. McDermott, 208 S. La Salle St., Chicago
Equipment & Engineering Co., London
Frazar & Co., Japan

O.S.T. 1660

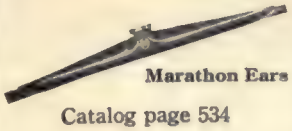
SAVING THE RAIL SAVES THE RAILWAY

# Spring Check-up

**time to profit by O-B Line Material Results**



**for instance —**



**Marathon Ears**

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**Lock Hangers**

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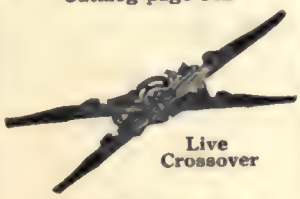


**Live Crossover**

Catalog page 579

**Write for detailed information**

# Increase Net Income
## By Reducing Up-Keep

ALTHOUGH passenger revenues continue to mount steadily, progressive properties are not depending entirely on increased traffic for larger earnings in 1927. Many properties are realizing that savings in operating expense, every dollar of which equals the net income received from 250 or more additional passengers, *are* possible—particularly through the use of modern O-B Line Materials.

Take Marathon Ears, with service records of 350,000 car passes and more, as an example. Properties using Marathon Ears report from two to three times the length of service formerly received per ear. Furthermore, line breaks have been reduced as much as 46 percent with the use of Marathons. The saving amounts to thousands of dollars yearly in some instances.

Other O-B Line Materials—Frogs, Cross-Overs, Hangers, Splicers,—effect similar worth while economies in operation. It is on the basis of their ability to increase net income by reducing operating expenses that O-B Line Materials have won industry-wide recognition and usage.

Take advantage of the Spring "Check-Up" by replacing worn out overhead materials with modern, long-life O-B Materials.

**Ohio Brass Company, Mansfield, Ohio**
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
344B

# Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES

# BASIC IMPROVEMENT

WHEEL performance can be no better than the material of which the wheel is made.

By using a special composition steel and heat-treating it to develop unusual qualities, the Davis "One-Wear" Steel Wheel gives long life without maintenance.

A new and different steel was necessary to make practical the "One-Wear" idea. Only the Davis Steel Wheel is made of this material.

## AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

# Lighting Fixtures

Pullman Type

Safety Type

To increase patronage add attractiveness and efficiency to your cars by selecting your equipment from the broad line of Keystone Car Specialties.

## Lighting Fixtures

The bright, steady, well-diffused light provided by these lighting fixtures is a practical necessity in well-equipped cars. Manufactured to the Keystone standard of quality, these lighting fixtures are both ornamental and durable. They add attractiveness and increase patronage.

*To get complete particulars of Keystone Equipment, send for Catalog No. 7.*

# ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Illinois Merchants' Bank Bldg.

PITTSBURGH
1123 Bessemer Building

BOSTON
88 Broad Street

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal Toronto, Vancouver

# American BROWN BOVERI

## PRINCIPAL PRODUCTS

*Mercury-Arc Power Rectifiers (steel enclosed)*

*Electric Locomotives—for any system of current, high or low tensions.*

*Complete equipment for railway electrification.*

*Rotary Converters.*

*Motor Generators*

*Complete equipment for outdoor and indoor substations.*

*Diesel-Electric Locomotives.*

*Automatic Regulators.*

*Steam Turbo - Generators for normal or high pressures and superheats.*

*Oil Switches and Circuit Breakers.*

*Transformers.*

*Turbo-Compressors and*

*Ships*
*Diesel Driven*
*Turbine Driven*
*Electrical Driven*

*Dredges and Harbor Eq*

# Mercury-Arc Power Rectifiers

## *A book that tells all about them*

THE industry is interested in American Brown Boveri Mercury-Arc Rectifiers. Many are buying them.

Many more are writing for the fuller information in our descriptive circular—No. 301.

That is what we invite you to do. These books are ready. We are mailing them out every day in response to requests for copies. You should have yours and we shall be glad to see that you get it promptly. Its pages will clearly demonstrate the detailed reasons behind such claims as—

Efficiency high over the entire working range. Simple operation and minimum attention. No synchronizing. Very high momentary overload capacity and insensibility to short circuits. Negligible maintenance. Low weight. No special foundations required. Noiseless and vibrationless operation.

American Brown Boveri Electric Corporation
165 Broadway, New York, N. Y. Camden, New Jersey
922 Witherspoon Bldg., Philadelphia 842 Summer St., Boston 230 South Clark St., Chicago

AERA 1927

# AMERICAN BROWN BOVERI

# Where Specifications Agree

For three years the Department of Street Railways of the City of Detroit has been making experiments and service tests to determine the proper type of double deck coach equipment for its requirements. Westinghouse Air Brakes were included on all test coaches, and following this actual operating experience, were included in purchase specifications for new equipment.

**Fleet Operators** everywhere have quickly recognized the value of air brake control and purchase specifications now read—"Air Brakes—by Westinghouse."

**Progressive Coach Builders**—whose engineers, in addition to forecasting future design trends, must consider the utility of every element in its relation to the reliability and economy of the complete unit, and whose sales executives must provide a vehicle to meet operator demand, with distinctive sales features—have responded by adopting Westinghouse Air Brakes as standard factory equipment.

Builders and Buyers specifications now agree—Air Brakes—by Westinghouse.

WESTINGHOUSE TRACTION BRAKE CO.
**Automotive Division, Wilmerding, Pa.**

WESTINGHOUSE
AUTOMOTIVE AIR BRAKES

# Astonishing Endurance

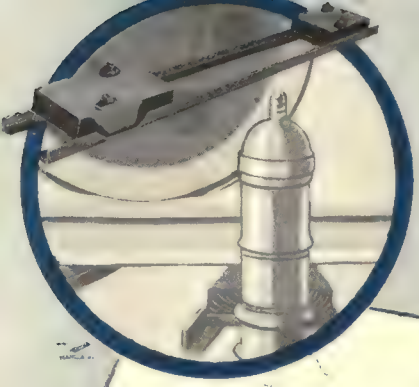
## *Proves the value of Dayton Ties*

TRACK laid on Dayton Mechanical Ties has hung up astonishing records. We can't tell you how long such track will last, because since its inception 15 years ago, none of it has ever worn out or cost a penny. of maintenance.

You know what it would mean to your property to so lift the burden of track maintenance and replacement. You know what permanently smooth track means in saving of rolling stock repairs.

Cities all over the United States testify to the enduring smoothness of track laid on Dayton Mechanical Ties.

*The Dayton Mechanical Tie Co.,*
DAYTON, OHIO



*Every Blue Tie,–*
*a Dayton Installation*

# See a Dayton Tie Installation For Yourself

This map, which gets more crowded every day, shows the wide-spread use of Dayton Ties.

There is an installation near you. Write us, and we'll tell you the specific property and location. See it for yourself, and talk to the engineers.

We're so certain of favorable testimony, we'll send you any number of names.

**The Dayton Mechanical Tie Co.,**
**Dayton, Ohio.**

*On April 15th, 1927*

THE NATIONAL PNEUMATIC COMPANY

*moved its New York offices to the*

GRAYBAR BUILDING

420 Lexington Avenue, New York

THIS new building, shown above, is located in the heart of the Grand Central business section, adjacent to the New York Central Railroad Terminal and, by subway connection, to the Pennsylvania Railroad Terminal.

NP

# "The Cincinnati Car is weight car built today Our property is equipped

Front vestibule or operator's cab of Cincinnati Lightweight double truck Interurban Car operating in Lexington, Ky.

Interior view of same car looking toward rear end and smoking compartment.

# CINCINNATI New CARS

*A step ahead of the modern trend*

# absolutely the best light-
# for electric railway service
# 100% with Cincinnati Cars"

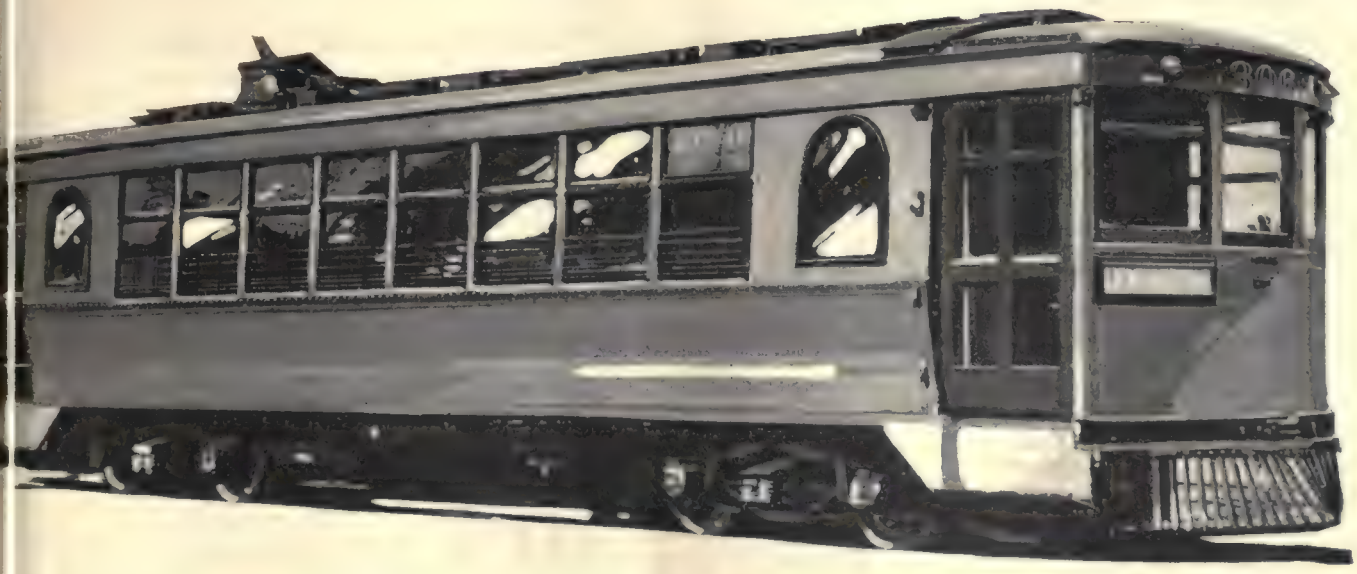
We have emphasized previously the exceptionally satisfactory record made by Cincinnati Lightweight NEW cars on the Kentucky Traction & Terminal Company's lines.

Now comes this further expression from Mr. Stuck, Superintendent of Equipment, with the statement that since these cars were put in operation the total cost of maintenance has been reduced from 3.2 cents per car mile to 1.3 cents per car mile.

These figures being taken at the beginning and end respectively of a five-year period, furnish convincing proof of the durability and continued economy which may be looked for in modern BALANCED lightweight cars as built by Cincinnati.

We will be glad to discuss in detail the reasons for Cincinnati's success in building *truly* modern cars, and the way in which they can produce equally satisfactory results on YOUR property.

THE CINCINNATI CAR COMPANY
CINCINNATI, OHIO



PHONO-ELECTRIC OVERHEAD IS A MEASURABLE ECONOMY

# Phono Hi-Strength

## *The Corrosion-proof Messenger*

Engineers engaged in the construction and maintenance of catenary overhead systems for interurban and electrified steam roads, soon realized that steel supporting wires bore a heavy tax to the demon of corrosion.

Phono Hi-Strength was developed to meet this condition. Immune to corrosion, as all the Phono Wires are, it nevertheless has a tensile strength averaging 130,000 lbs. per square inch. And so successful has the use of this wire been that the engineers for such outstanding electrifications as the N. Y., N. H. & H., the Virginian Railway and the Norfolk and Western, have specified it for a large part or even all of the overhead construction.

You will find this subject of strength, corrosion resistance and conductivity in wires for modern overhead construction, exhaustively dealt with in the Phono Book. A copy will be sent on request.

**Phono-Electric**
*The triple-wear Trolley Wire*

**Phono Hi-Con**
*Conductivity up to 80%*

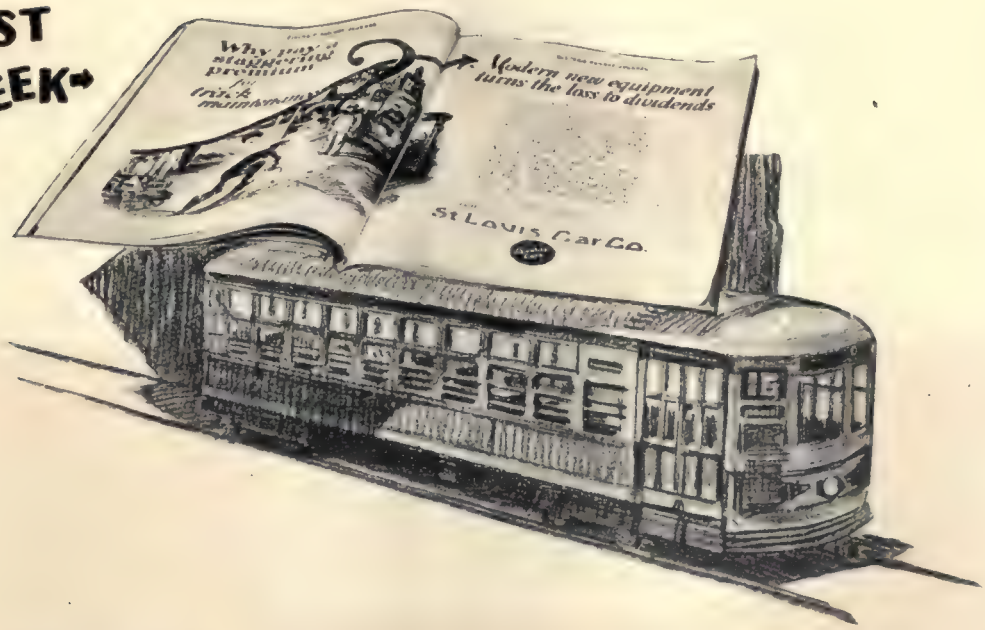
**Phono Hi-Strength**
*the corrosion proof messenger*

Bridgeport Brass Co "Bridgeport" Bridgeport Connecticut

BRASS CO. TRADE MARK

*A COMPLETE WIRE SERVICE FOR ELECTRIC RAILWAYS*

LAST WEEK

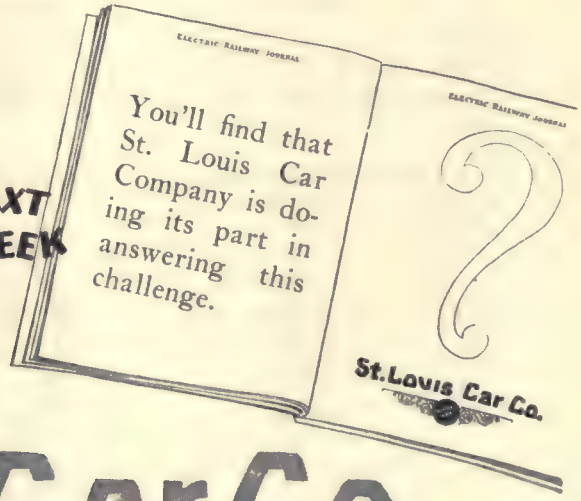



# This Week—we accept a challenge

"In the struggle to co-ordinate various vehicles into modern transportation systems, the electric railway manufacturer must meet the development and merchandising aggression of his competitors. The electric railway manufacturer must tell his story frankly, even bluntly, if he expects to move ahead under modern conditions. . . Our big job is to develop and sell a product which will attract patrons."

As car builders the St. Louis Car Company accepts this implied challenge of Mr. Willis H. Sawyer speaking for the American Electric Railway Association.

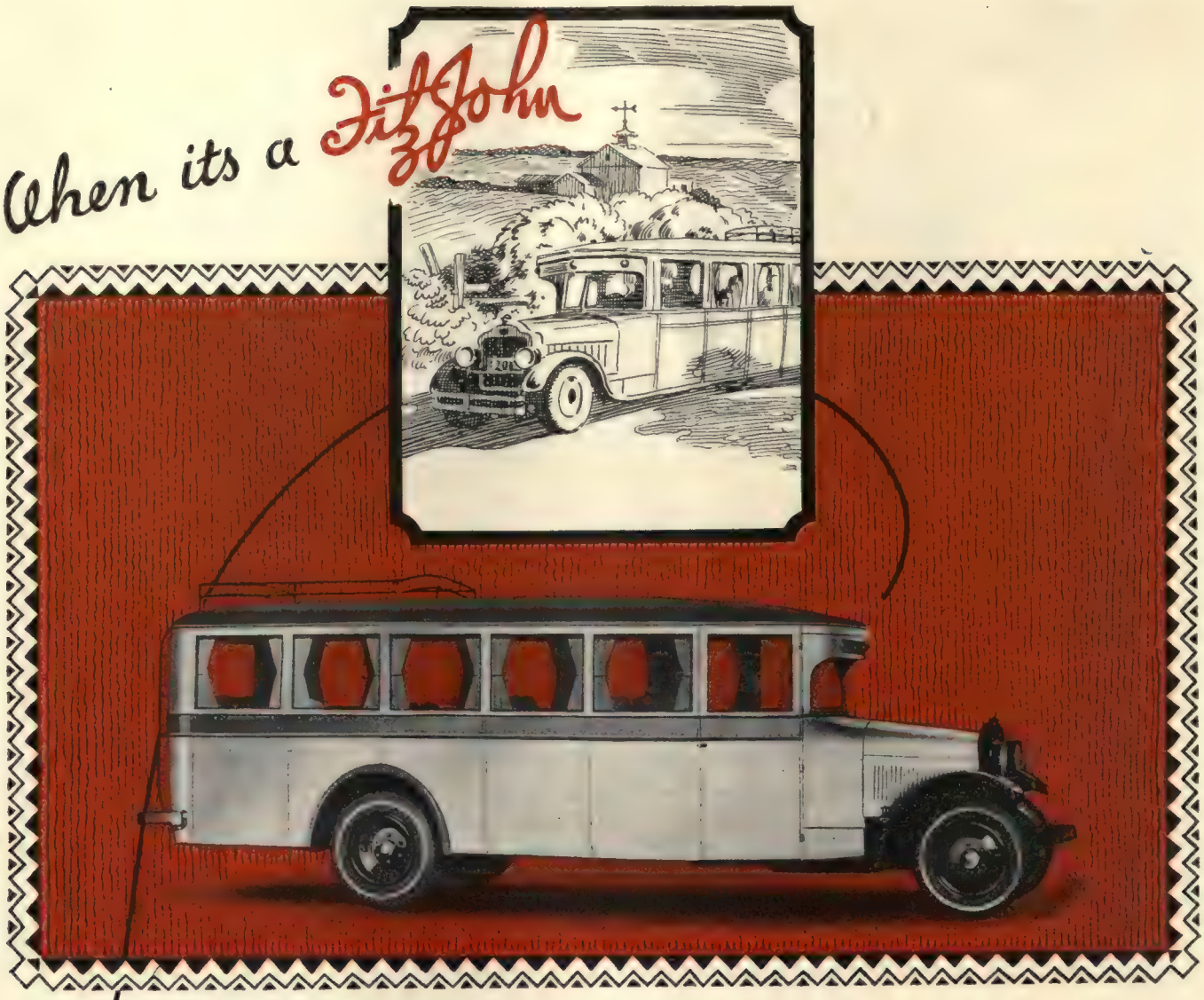
NEXT WEEK




St. Louis Car Co.

Quality Cars

When its a Fitzjohn



# Folks ride in comfort

Comfort of riding in Fitzjohn bus bodies suffers nothing by comparison with other luxurious modes of travel.

The deep seated, individual, costly luxury of the limousine—the cushioned panoramic vision of the Pullman—the lounging leg-room of the steamer chair—offer nothing to the restful relaxation of patrons who have once sensed the ease of bus riding in Fitzjohn parlor coach bodies.

That's why the first ride is an open invitation for folks to ride again and again in a Fitzjohn bus body. And that's what builds patronage and profits.

Choose your bus body with the same care you choose your chassis. Look for attractiveness, beauty of line, appointments, individual passenger comfort—these physical factors draw passengers to your lines.

Then demand ruggedness, freedom from costly repair and serviceability.

You'll find Fitzjohn supplying all—for any chassis—for any type of service.

And you, too, will look to Fitzjohn to furnish the bodies on your next bus order.

Fitzjohn

MANUFACTURING COMPANY

Muskegon·Michigan

# A New G-E Welding Electrode

## *They said:*

G-E Type "B" is great for automatic work, but a little fast for hand. "Give us a G-E Electrode with the same good features for hand work."

And Type "F" G-E Welding Electrode was developed by General Electric. It has exceptional stability—an operator using it can work longer with less fatigue. Because of less dissipation it will deposit more metal to the work.

Type "F" is a good bare electrode, chemically treated so that it has for hand welding the same characteristics that have made the Type "B" fluxed electrode a leader in the automatic field. Although primarily for hand work, it can be used on automatic welders. Write the distributor nearest you.

### Special Distributors for G-E Welding Electrodes

American Steel Eng. Co.,
10 South 18th St.,
Philadelphia, Pa.
also
601 Granite Bldg.
Pittsburg, Pa.

Bird-Potts Co.,
Atlanta, Ga.

Capital Electric Co.,
Salt Lake City, Utah.

Harron, Rickard & McCone,
139 Townsend St.,
San Francisco, Cal.

Robert M. Hartwell,
353 East 2nd St.,
Los Angeles, Cal.

Industrial Sup. Co., Inc.,
329 East Second St.,
Los Angeles, Cal.

Hendrie & Bolthoff Mfg. & Supply Co.,
Denver, Colo.

P. F. McDonald & Co.
17 King Terminal,
Boston, 27, Mass.

Matthews Electric Sup. Co.,
1823 First Ave.,
Birmingham, Ala.

The C. S. Mersick & Co.,
New Haven, Conn.

National Welding Equip. Co.,
223 Main Street,
San Francisco, Cal.

Root, Neal & Co.,
Buffalo, N. Y.

Joseph T. Ryerson & Son, Inc.,
Chicago, Ill.
also
Cincinnati, O.
Detroit, Mich.
St. Louis, Mo.

Seattle Hardware Co.,
Seattle, Wash.

Southern Electric Co.,
Baltimore, Md.
also
Charlotte, N. C.
Norfolk, Va.
Richmond, Va.

Southwest General Elec. Co.,
Dallas, Texas.
also
Houston, Texas.
Oklahoma City, Okla.

Strong, Carlisle & Hammond Co.,
Cleveland, Ohio.

Union Iron Works,
Spokane, Wash.

Virginian Electric Inc.,
Charleston, W. Va.

A. J. Wilson Co., Inc.,
120 Liberty St.,
New York, N. Y.

W. A. Ramsey, Ltd.,
74 Queen St.,
Honolulu, Hawaii.

Oliver H. Van Horn Co., Inc.,
522-534 Camp Street,
New Orleans, La.

Welding Service Co.,
50 Church Street,
New York, N. Y.

**TYPE A**
recommended for cast iron.

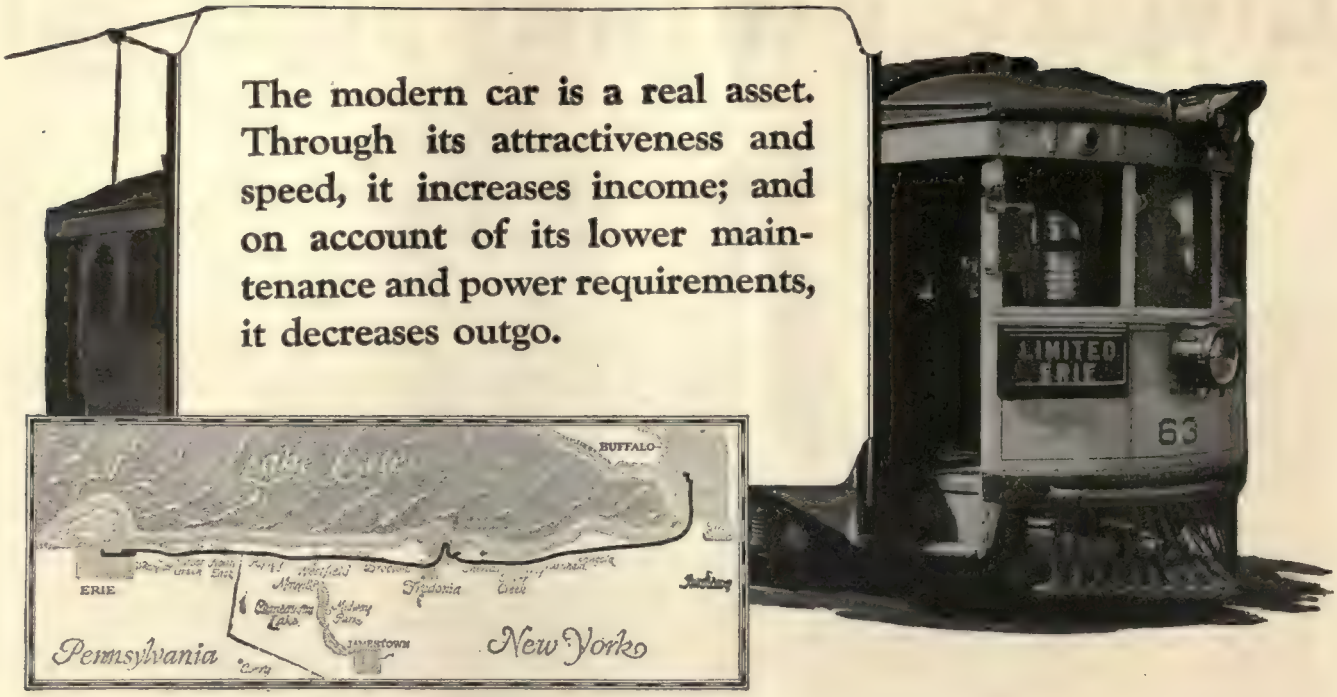
**TYPE B**
for steel.

**TYPE F**
for general steel welding.

550-12

# GENERAL ELECTRIC

MERCHANDISE DEPARTMENT, BRIDGEPORT, CONNECTICUT




# A loser for 16 years becomes a profit maker

The Buffalo & Erie Railway earned in 1925 a profit for the first time since its completion in 1909. And this was accomplished in the face of a business depression in that locality.

The management attributes this transformation to the use of modern light-weight one-man cars, with which this company renders the utmost in attractive service. In addition, operating cost was reduced 14.4 per cent and gross revenue was increased 7.5 per cent in the first 10 months.

These new cars, equipped with four G-E 247 motors, K-35 control, and CP-27B compressor, are capable of a speed of 60 miles per hour. Energy consumption is less than 2 kw-hr. per car mile. A comparison of operating figures per car mile shows:

| | 1924 (Old Cars) | 1925 (New Cars) |
|---|---|---|
| Way and structures | 5.6¢ | 3.1¢ |
| Equipment | 2.3¢ | 1.9¢ |
| Power | 5.0¢ | 3.4¢ |
| Transportation | 14.0¢ | 10.7¢ |
| General and miscellaneous | 10.6¢ | 9.8¢ |
| Total | 37.5¢ | 28.9¢ |

General Electric equipment has played an important part in the successful modernization of numerous roads. It has helped to make many of the operating records which have proved conclusively the value of the modern light-weight car.

330-40

GENERAL ELECTRIC

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# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

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CHARLES GORDON, *Editor*

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## Patching When the Material Is Too Old to Hold the Stitches

EVERY woman who does sewing knows well enough that it is a waste of time to put on a patch unless the material is strong enough to hold the stitches. Similarly, every electric railway manager should know that it is futile to build up a piece of special trackwork by welding when there is not enough rail left to hold the new metal. Unfortunately, however, that is just what some companies are doing.

To take a specific case, a railway in an Eastern city has spent much good money patching up a right-angle double-track crossing that was worn out long ago. Welding has been done on this special trackwork on an average of once in two months for years past. The crossing is so old, however, that the repairs never last long.

Every time repairs are undertaken it is necessary to transport the welding apparatus to the job, open up the pavement, weld, grind, close the pavement and take the apparatus away again. A crew of seven men has usually been employed on this job—a foreman, two traffic flagmen, a welder and his helper, and two laborers to take up and restore the pavement and operate the rail grinder. Always the work has been much hampered by traffic and has taken many hours for completion. In its effort to maintain the old crossing, this company is spending considerably more every year for labor alone than the interest and depreciation charges on a piece of new special trackwork.

Truly in this case it may be said that the railway is paying for new material without getting it.

## Repair Defective Cars Before They Break Down

MECHANICAL men agree that higher standards of maintenance will improve performance. Many examples where records are kept carefully have shown that when once the equipment has reached a state of excellent repair, costs of the work are reduced considerably. The expense of putting the equipment in the condition desired, however, has proved a serious obstacle on many railways. At the present time most electric railway men are more alert to the need of high-class overhauling than ever before. Increased study is being given to maintenance problems and many railways are adopting higher standards with closer fits for wearing parts.

In the class of inspection work to prevent failure much can be accomplished, not only in reducing ultimate maintenance costs but also in improving public relations through preventing failures in service where the public will see them. Defective parts should be renewed before they cause difficulties and equipment should be kept as nearly as practicable in its original condition. This requires a carefully arranged organization with work so laid out that it will not be done hurriedly and the workmen will have ample time to make sure that all parts are inspected and repaired where necessary.

The great tendency where men are hurried and overworked is for them to slight parts which will continue to operate without producing an immediate failure. Frequently complete breakdown will result before the car is due for its next regular inspection and then costs mount rapidly, for the damaged parts often cannot be repaired but must be replaced.

Those responsible for maintenance of electric cars will do well to collect all the data possible regarding costs which result from repairing equipment after it fails, and present these to general managers in as convincing fashion as possible. Such arguments as this are needed in order to put across any campaign for higher standards of repair work and improvements in car equipment so as to give the best service from the car rider's standpoint.

## Home-Made Tools Are Often Crude and Expensive

ONLY one field remains that is not flooded with tools for every inconveniently located bolt or screw. That is the railway industry. In fact, the tool manufacturers have scarcely entered it. In the past each master mechanic made most of his own tools when he had a special application where a standard tool would not accomplish the desired results. This habit of making his own tools is expensive, for it requires a great deal of his time for supervision which should be spent in studying ways and means of improving maintenance conditions. When the home-made tool is completed it will have cost more in man-hours to make it, which will be charged to the maintenance account, than would a corresponding factory-made tool. Home-made tools are generally very crude. When questioned as to why the tool was made the usual answer is, "We needed it and did not know where to buy it."

Since electric railway equipment is standard, if one master mechanic needs a special tool for a special application it is almost certain that some other master mechanic would be glad to get the same tool if he knew such a tool was in existence. The tool manufacturers have a group of engineers who are trained in the design and application of special tools. These staffs of engineers are available to assist in solving the tool problem in the railway field if they are consulted. Often it

**This is the issue in April that is devoted essentially to maintenance and construction subjects**

may only be necessary to make a slight change in some existing tool to fit the special purpose. Even though it may be necessary to design and make the tool from the ground up, the manufacturer can do it cheaper than it can be made in a railway shop. If the manufacturer can be convinced that a special tool developed for one railway can be sold at a profit to a number of others the cost of development may be absorbed by him.

By consulting tool manufacturers for all special tools two important things will be accomplished: First, the "Jack of all trades" is kept from wasting a lot of valuable time and material making some unnecessary tool just because he would rather do that than work at some productive job, and, secondly, if a tool manufacturer develops all special tools every railway operator can avail himself of these tools.

In the Annual Maintenance Number and in this issue of ELECTRIC RAILWAY JOURNAL a section is devoted to "Improved Equipment for Electric Railway Maintenance." Literature from these manufacturers should be obtained by maintenance foremen and kept on file for ready reference.

## The Public Likes Soft Seats

WHERE, oh, where, is the man named Legion who argued that seats of slats or formed wood were so durable, so sanitary and so cheap to buy and maintain? Why provide shock absorbers in the seats, when kindly Nature had provided them in the passengers' anatomy?

Oddly enough, these arguments were so unconvincing to the pushful automotive fellows that not one of them put out an automobile with springless seats. To them "seat" was synonymous with "cushion." The purveyor of the cheapest cars incased his springs with near-leather; while the maker of cars "of the better kind" went to limp leather and over-stuffed cushions for the open cars and plush or velours for the closed ones. The very air itself was made to serve as down.

These improvements followed naturally, since the seat user was primarily the buyer of the vehicle, whereas in railway transportation the seat-user's choice was controlled by others. Now that almost everybody has enjoyed the experience of riding on air, the public utility carrier on rails is following in the wake of the personal carrier on rubber.

Desirable and even vital to ride selling as this use of softer seats may be, two factors must not be overlooked that make a direct, complete imitation of personal car standards unnecessary: First, a good car running over a good rail does not have as much jounce and bounce as the automobile. The simplest proof of this is the greater ease of reading. Second, a public transportation vehicle, especially in city service, cannot afford as much area per passenger as a personal car.

So it appears that eminently satisfactory seats can be provided for trolley cars without too wide a departure from the shapes and over-all dimensions of standard cross-seats. It is to be expected that over-stuffed or air cushions and extra-padded backs may increase seat centers to the point where 44 seats of the old type allow room for only 40 seats of the new. This is perhaps as large a concession as can sensibly be made.

It hardly seems necessary to go to the extent of installing individual bucket seats or otherwise striving to secure the effect of a Pullman chair car. Such arrangements are excellent for long-ride, interurban service, or for de luxe service, but are likely to prove rather confusing for the most expeditious handling of short-ride, city passengers during the "standing" hours. Recent visits to cities with soft-seat cars leads to the conclusion that the public is well pleased with standard cross-seats in the modern cushionings and is not likely to insist that its bread should be buttered on both sides.

## Perfection of Detail Differentiates the Artist from the Dabster

FOREMOST among the qualities which have distinguished the great artists of all periods has been meticulous attention to detail. The painter does not execute his central figure with great care and then fill in the background in a hit-or-miss fashion. Perhaps it is a far cry from the painter with his palette to the painter of electric railway rolling stock, but the latter might profit by following some of the principles by which the former is guided.

Frequently the effect of a really creditable car design is marred by the intrusion of a few inharmonious elements. Take, for example, a car interior where the seats have been upholstered in leather, the floor has been covered with linoleum and the woodwork finished like fine furniture. After taking these steps to make the car comfortable and attractive, it is a pity to cover nearly all the available flat surfaces with the railway's prohibitions and warnings. Yet this often is done. A single de luxe car has been placarded with these several notices:

No smoking.
Spitting is unlawful.
Watch your step.
Do not talk to the operator.
Passengers are allowed to ride on front platform.

Variations of these themes, as well as many other ones, can be found in countless cars. At best the effectiveness of such stereotyped notices is extremely doubtful. Every one knows that smoking and spitting are forbidden, yet a certain number of passengers persist in doing these things despite the signs. Riding on the platform and talking to the operator are matters that can be controlled without plastering notices on the bulkheads. If the railway management really wants to attract the motorist by furnishing transportation approximating the private automobile in comfort, he should avoid covering the inside of his vehicle with notices and warnings that detract from its appearance and irritate the passenger.

## Temporary Repairs Are a Source of Danger

SOMETIMES, due to a shortage in the working force or to an abnormal number of crippled cars, temporary repairs are made in order to allow the car to re-enter service immediately. The intention in some cases is to bring the car into the shop the following day and make permanent repairs. However, in many cases the following day's work schedule is filled completely and the car is allowed to continue in service.

The necessity for making permanent repairs promptly cannot be over-emphasized. Experience has proved that delayed repairs are uneconomical. They make the ultimate repairs more expensive, both in actual cost and in the length of time that the equipment must be with-

held from service in order to make them. Frequently breakdowns that result on the road cause delays and inconvenience to passengers. In order to foster a good feeling with the public, delays in service must be kept to a minimum. This can be done by immediate care of repairs and frequent inspection which should cover all details thoroughly, even to small and seemingly unimportant parts.

## Principles and Methods of Rate Regulation

JUST about the time that the decision was announced in the St. Louis & O'Fallon Railroad case there appeared the April issue of the *Yale Review*, with an article "Principles and Methods of Rate Regulation," by Arthur T. Hadley. This article, like the decision, has been widely quoted. Dr. Hadley's presentation is a brief but learned discussion of the matter. He goes back to the earliest times and says that for more than 2,000 years there has been a conflict between traders and philosophers as to the basis of value. His idea is that a reasonable rate is one that can be justified on grounds of public policy. It must not be so high as to place an unfair burden on the people who require the service, nor so low as to inflict an unfair disability on the people that render it.

To the leading electrical men in the United States Mr. Hadley pays a tribute by saying they have known how to avoid some of the difficulties into which the railroads have fallen. They have grasped the principle that the interests of the public service corporation are closely identified with those of the public which it serves, and they have done a great deal to make the people grasp it. They have taken the authorities into their confidence. They have consulted them in advance as to matters of financial policy. They have not been content with avoiding legal action; they have tried to avoid grounds of suspicion. The consequence is that public service commissions have generally been friendly to the electrical industry, and as a secondary consequence there has been more rapid and more varied development of electric service in this country than anywhere else, and the public has obtained its current at comparatively cheap rates. This is a nice compliment. On the whole, it is well deserved.

Where freedom is abused the abuse can be prohibitive, but a few abuses should not be made a reason for abolishing freedom. Seven principles are cited by Mr. Hadley as having been proved by experience but ignored by governments at their peril. He holds to the opinion that the use of cost of plant, and especially original or historical costs, as a rate base is wrong in principle and often dangerous in practice. He says that the true basis for judging whether rates are reasonable is comparison with those of other companies working under similar conditions. If the rate is low in comparison with what prevails elsewhere, and has developed traffic to an unusual degree, profits from that traffic have been well earned.

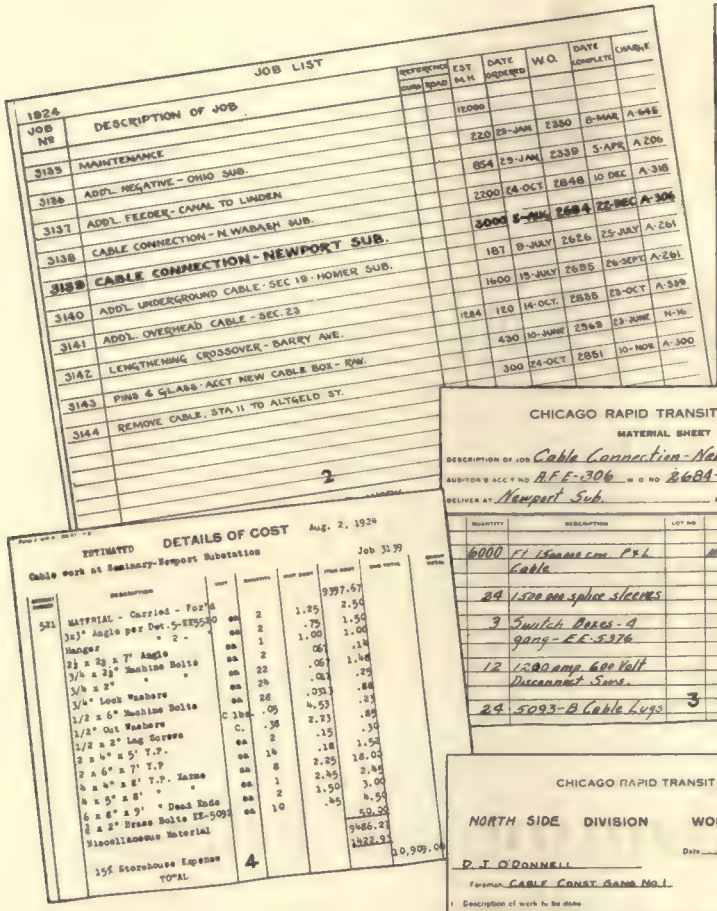
An important need, as he sees it, is to give public service commissions an opportunity to study the history of past attempts at regulation and the economic principles which have determined their success and failure, and to encourage them in such study. It is his idea that they should not be so overwhelmed with specific cases and complaints as to have no time for dealing with general questions of economic policy. They should be regarded and should regard themselves as expert advisers of the courts, the legislatures and the public on matters of vital importance to the country's future. His doctrine certainly is sound that the question of rate regulation must be considered from both ends—producers' and consumers'. And the conclusion is inescapable that it is quite as important for all parties to secure a supply equal to the demand at any given price or rate as it is to have that rate fixed as low as possible. There will be general agreement, particularly among utility men, with the observation of Mr. Hadley that politicians find it easier to concur in a widespread popular error than to decide for themselves what will prove best in the long run. It certainly takes a good deal of firmness and a good deal of economic and historical knowledge on the part of a commission or a court to protect the interests of the future against the loud-voiced demands of the present.

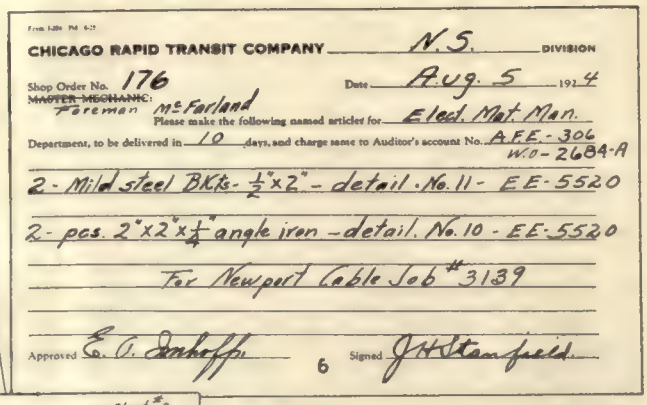
## Massachusetts Companies Work in Concert

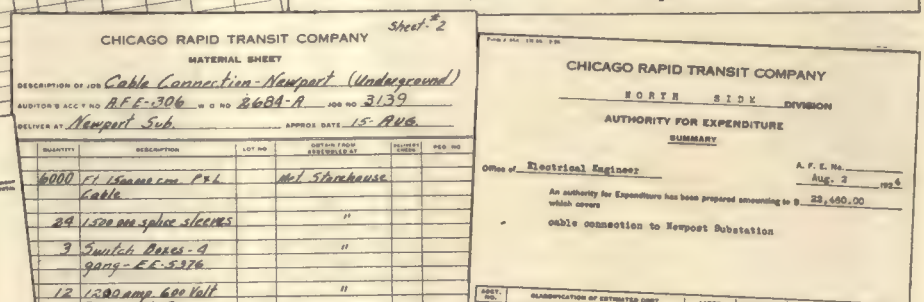
LESS attention in railway circles than it deserves appears to have been received by the operating agreement entered into recently by the New England Transportation Company, bus operating subsidiary of the New York, New Haven & Hartford Railroad, and the Eastern Massachusetts Street Railway. Under the terms of the arrangement between the companies the electric railway will receive from the bus company 18 cents for each passenger transported between East Walpole and Boston and Boston and East Walpole on the run from Attleboro to Boston.

The route covered by the buses encroaches upon territory served by the electric railway. The sole issue before the Massachusetts Department of Public Utilities in the case was whether public convenience and necessity required the operation of motor vehicles over the proposed route. The commission thought that it did. It ruled on this point, and this point alone. It volunteered the opinion that "however unjustifiable and unwarranted the payment to a street railway of a portion of the fare received by the transportation company may be, it does not affect the question which presents itself on this petition." And that question, as previously indicated, was one of public convenience and necessity.

The participation issue appeared to be clear cut. The transportation companies apparently found it not only expedient but mutually advantageous to enter into the agreement they did. All the points are not plain to the outside commentator, but it is not difficult to see that the disposition the companies made of the matter was advantageous to the public. Competition in the territory, if it received state sanction, which is unlikely, is unthinkable and not in the best interests of the public or the company. On the other hand, one of the companies involved was in a position better than the other to give the service, and it seems only sensible that the utilities of their own volition should conclude between them an arrangement satisfactory to each other. Certainly the end achieved seems on its face to be much more salutary than other so-called solutions resorted to in the past. If some such arrangement as this could have been amicably worked out in another Eastern state, to mention just one instance, recourse would not have been necessary there to the courts with all that such action implies of a struggle to the bitter end. It would not do to say that any compromise is better than such a contest, but it does appear in the Massachusetts case that compromise was much better than contest.

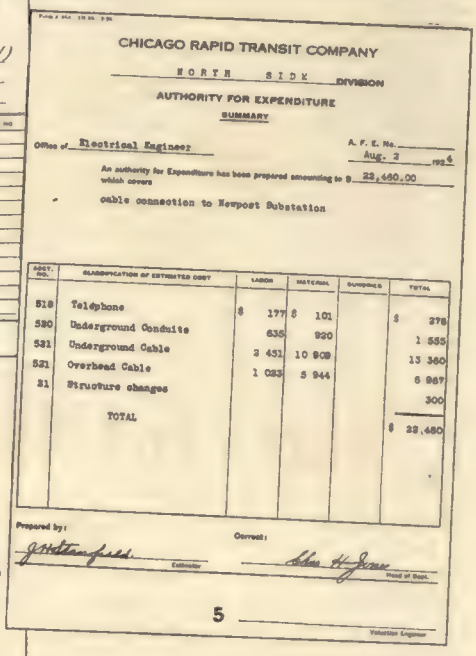


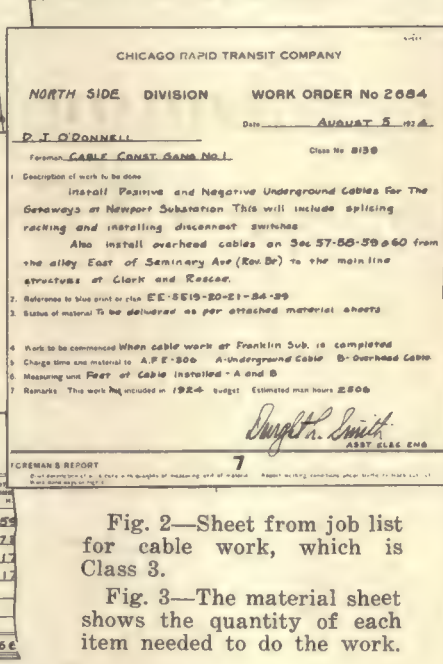



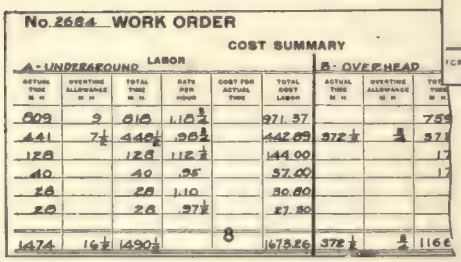







A few of the forms used for following up and recording progress of work



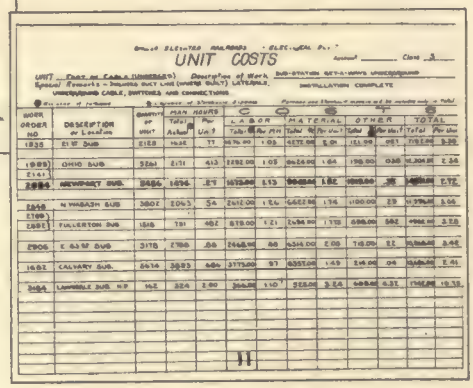
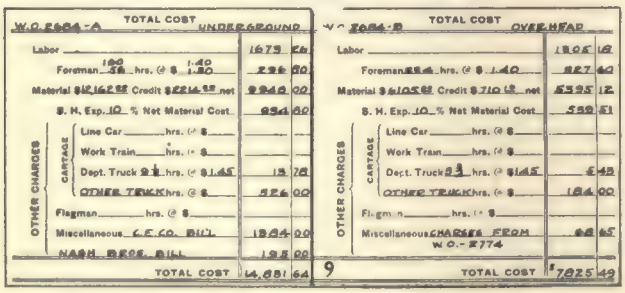




Fig. 2—Sheet from job list for cable work, which is Class 3.

Fig. 3—The material sheet shows the quantity of each item needed to do the work.







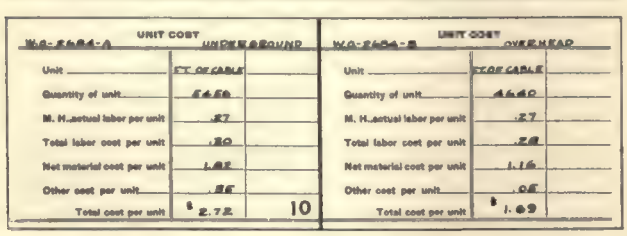



Fig. 4—Form of sheet used to work out details of estimated cost.

Fig. 5—The authority for expenditure gives a summary of labor and material items.

Fig. 6—Items to be made in the department shop are requisitioned on a shop order.

Fig. 7—The work order is the actual authority for beginning construction work.

Fig. 8—Summary of cost is given on completed work order sheet.

Fig. 9—The total cost sheet gives much valuable information.

Fig. 10—Unit costs are figured and entered on a separate sheet.

Fig. 11—The condensed record of unit costs makes comparison easy with other similar jobs.

In pulling in lead-covered cable, particular care is used not to injure the sheath

# Careful Organization of Force Stimulates Effort

*By Dwight L. Smith*
**Electrical Engineer Chicago Rapid Transit Company, Chicago, Ill.**

**To complete work speedily and make sure that finished jobs will be done in a manner to minimize service interruptions the electrical department must be organized thoroughly and be provided with many labor-saving tools**

WORK in the electrical department of the Chicago Rapid Transit Company includes the operation, construction and maintenance of all electrical equipment except for rolling stock, signals and interlocking. It includes third rail, cables both underground and overhead, telephones, lights, bells, overhead trolley, pole lines, track bonding, storage batteries and such substations as are owned by the company. Maintenance of the system requires about 50 men, and work which can be classed properly as construction requires about 50 more.

This organization includes a centralized control, a definite and logical routing for all work, and specialists for each step in this routing. No step is begun before each preceding one is completed and checked, so that the personnel responsible for each step can proceed with full assurance that everything previous is in readiness, and entire attention can be devoted to doing each part with the utmost efficiency and dispatch.

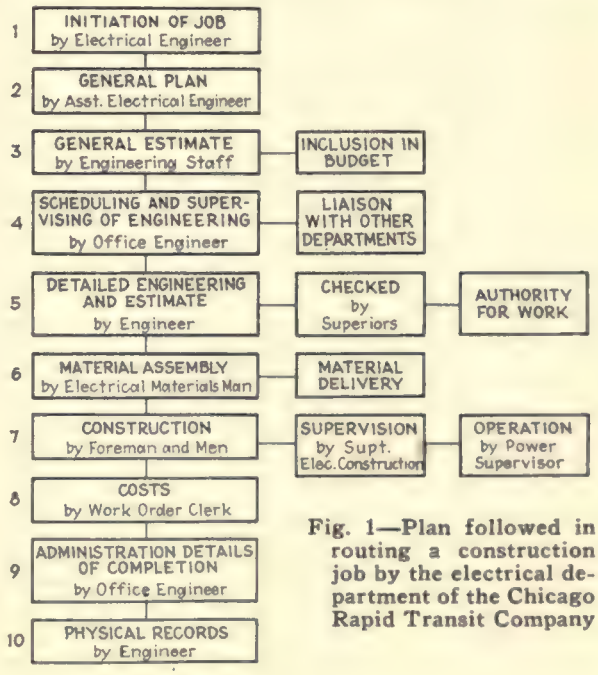



**Fig. 1—Plan followed in routing a construction job by the electrical department of the Chicago Rapid Transit Company**

The general plan of routing construction work is shown on Fig. 1, Construction Job Routing. As a large engineering staff is employed, the construction organization does not even hear of a job until the engineering is completed, the work laid out for it in the smallest detail, all materials on hand and ready for delivery to the job, necessary permits obtained, and accompanying work by other departments arranged for; in fact, until there is nothing for the construction forces to look after but to do the physical work as planned. Frequently the actual construction work is the smallest part of the job. As an illustration of the methods employed, a job recently completed of making the cable connection to a new substation will be referred to in detail.

Most items of work initiate within the department, although certain items become necessary because of work of other departments. The greater part of a year's work is decided by inclusion in the budget at the beginning of a calendar year. As soon as the budget is approved all such known items are listed on a job list, Fig. 2. Such a list is made for each class of work, cable work being Class 3, and each individual job is given a number the first digit of which indicates its class. This job number is the office reference, and in a file identified by this number all information on the job is kept together.

The job list provides: (1) A ready record of the jobs which must be completed during the year; (2) a quick reference of the estimated time required for each job, and (3) a running record as to the status of each job, i.e., whether it is still untouched, under construction or completed.

At the commencement of each year the job list is first used to make a survey of labor and material requirements. The man-hour figures are based on unit man-hour costs for past work of a similar nature. The estimates as included on the job list are of course rough, for no details of the coming jobs are yet known, but are sufficiently close to make estimates of the total amount of labor for each class. These totals indicate the number of men required to complete all work in the year's program. This property has found that for the average cable job a gang of six men and a foreman is the most efficient and the total man-hours thus indicates the number of gangs necessary.

The job list is a continuous one. It is not closed until the end of the year and then any unfinished work is transferred to the next year's list. When work unforeseen at the beginning of the year develops it is entered, given a number and placed at the bottom of the list. There is always a certain amount of this additional work and so any estimate for man strength must make the necessary allowance.

Material requirements are also estimated at the beginning of each year, considering the items of major material on similar jobs in the past. It is not possible to estimate exactly all minor material, but this is a small part of the total. Estimating the major items gives the purchasing department an opportunity to buy on favorable markets and to order in ample time to have the material on hand when needed. Deliveries are specified throughout the year in accordance with the work program, sufficient leeway being allowed to make sure of receipt but allowing delivery at the same rate as that of use, thus keeping the storekeeper's amount of stock as low as possible.

The number of construction gangs having been determined, a job schedule is next made for each of them, showing the order in which each job will be started, and, from the man-hour estimate and the number of men at work, the actual date for starting. The order in which the jobs are scheduled is, in general, determined by the degree of necessity. In making the schedule the correlated work of other departments must be considered, and they are consulted and necessary compromises made to suit best all those concerned. The job schedule also gives information as to the progress of the work and references to allied work, status of authority, layout and material.

Jobs are assigned to the engineering staff for layout in the same order that they appear on the job schedule and from one to six months in advance of the time set for commencing the construction. Up to the time of assignment only the most general information on them is known, as a few preliminary sketches, correspondence and the general plan dictated by the department head. This information has been kept together carefully in the job file and is turned over and explained to the engineer.

In almost all jobs there are several ways of accomplishing the same result, but it is part of the engineer's work to determine the best and most efficient way. However, to assist the engineer as well as the construction forces, types of construction and kinds of material adopted as standards are used whenever possible. These are got up in standard circulars and standard prints. Each foreman is provided with a loose-leaf binder containing a complete set, so that when the engineer decides to make use of a certain standard he has only to indicate on his layout its number and the foreman will know exactly what is wanted.

The duties of the engineer are: (1) To make detailed drawings of the installation; (2) to make a detailed list of the kind and quantity of every item of material necessary for the job; (3) to make a detailed estimate of cost, and (4) when the job is completed to make or revise the permanent records.

For the substation connection job referred to, the engineer's first work was to determine the number and size of cables required. An annual survey made under heavy winter load conditions gives ampere loads and voltage conditions on each feeder section of the Chicago Rapid Transit system. This becomes a permanent record in the power supervisor's office and reference to it indicates the cable capacity necessary.

A field survey showed an underground duct line as the best method of carrying the cables from the substation to the right-of-way. With this determined, locations for manholes, grouping of cables in ducts and in laterals, location of laterals and disconnect switches were decided. On this job, second-hand lead-covered cable was to be used and the engineer had to check his required cable lengths carefully and tabulate them against lengths on hand to insure the minimum wastage.

While a part of each construction job can be covered by standards, many items cannot, and it is the duty of the engineer to lay these out in detail and provide the proper material. For instance, in the job illustrated, while the switch boxes are standard, the method of mounting is not, and necessary iron brackets had to be designed to fit the location.

A small shop is operated by the department, to build small special items of this sort; standard items and large quantities of special items can be bought from commercial sources more cheaply than they can be made outside of the organization.

The layout completed, showing in detail what was proposed and where and how it was to be done, and every method and material used plainly indicated, the next step for the engineer is the preparation of the material sheet illustrated in Fig. 3, showing the quantity of each item, both special and standard, needed to do the work. This must cover everything necessary, even to bolts, nuts and washers, so as to prevent any delay to the construction forces from lack of proper and sufficient material.

Special authority must be obtained for each construction job and the cost estimate for this authority is a part of the engineer's work. These are shown in Figs. 4 and 5. The material sheet needs only to be priced from material costs on record in a card system in the office, or obtained through the purchasing department for special material. Labor cost estimates are made by reference to previous unit costs, carefully checked by comparing the work into component parts and by making independent estimates of each part. Adding the proper per cents for stores expense, engineering and contingencies a total cost is obtained. The care used in making these is such that most job costs come within a few per cent of the estimates. All planning and estimates made are then checked carefully and approved by the department head and authority for the work is requested.

The proper authority obtained, material sheets are gone over and compared with blanket orders, material not already on order is requisitioned, and items to be made in the department shop are requested by a shop order as shown in Fig. 6. Appropriate notes are made on the material sheet. Work to be done by contractors or other departments is arranged for. The material sheets are sent to the electrical materials man. Follow-up checks are made from week to week to insure

Above—Shop operated by the electrical department to build small special items
Below—Special brackets used for mounting are made in the blacksmith shop

The splicer's cart is a handy piece of equipment brought to the job .

In pulling overhead cables with a winch truck, it is necessary to anchor the cable reel

that all material will be in readiness when the schedule starting date arrives.

An interesting and necessary link in this department's organization is the electrical materials man, a stores department employee who devotes his entire time to handling material used by the electrical department and whose function is to furnish the necessary material delivered at the job, when and where needed. His duties include both the physical handling of this material and the clerical work necessary to account for it, as well as supervising the transportation necessary for its delivery.

The material sheet is received weeks, even months, before a job is scheduled to start. A reasonable length of time in advance he commences to gather together the material for a job. The smaller items are assembled in a material container, a box equipped with a standard lock to which each foreman has a key, and larger items are assembled in a bin, each of them as well as the containers being tagged with the job description and number. This assembly is simple, as all electrical material is kept in one storehouse, and its storing in steel cases with unit piling, each item identified by a lot number, makes it easy to find and count quantities. The items made in the department's own shop are also picked up and assembled with the balance of the material.

If repeated checks, as the commencement of the job approaches, show that certain items may not be received in time, it may be necessary to send after and pick up this material from local stocks on emergency orders, or to substitute obtainable items.

The material sheet shows the approximate date the material for each job is to be delivered, and the materials man plans to have it ready a few days in advance. In every case, however, the foreman advises by telephone the exact date when it is wanted and it is delivered only on receipt of this advice.

A truck has been found the cheapest and most efficient means of delivering practically all materials, and this company finds that one 1½-ton truck, intelligently handled, can ordinarily keep the entire force supplied with material. This requires consolidation of deliveries to different gangs working in the same area, and elimination of waste time. The truck is loaded in the late afternoon and is started out the next morning in time to arrive at the job when the construction force commences work. Even the smallest items of material are delivered by truck, the workmen being forbidden to come into the storehouse for any reason.

In delivering material, the truck driver takes with him two copies of the material sheet, one of which is signed by the receiving foreman, who retains the second copy of his list.

After each large order for material has been filled, or at intervals of one month or less, the stock of all items of standard material is checked against an indicated minimum quantity and orders are placed for all those which have fallen below the minimum. All the steps detailed herein have been taken before the construction force has even heard of the job. This force consists of a varying number of gangs, each in charge of a foreman, who reports directly to the electrical superintendent.

About a week before each job is scheduled to start the necessary information for the foreman is assembled. A numbered work order, illustrated in Fig. 7, is the actual authority for the construction. It refers to the job number, gives a brief description of the work, refers to the blueprint numbers of the details; indicates the auditor's charge number for the work, shows the measuring unit to be used by the foreman in making his report, and also shows the estimated man-hours for doing the job.

Six copies are made of the work order, one for each of the job foremen, electrical superintendent, electrical materials man, cost clerk, power supervisor and superintendent of maintenance of way, the latter to keep in touch with the department most interested in co-ordinating work with the electrical department.

Accompanying the foreman's copy of the work order are blueprints of all drawings pertaining to the job and copies of all material sheets. Since construction gangs have no headquarters other than on the job, correspondence with them is by U. S. mail to the foreman's

homes, and they use the same means to send their time slips and reports to the office.

Within the next few days the foreman takes several hours away from his current job and goes to the location of the next one to study it there and plan his procedure. On that visit the superintendent accompanies him and explains and settles any details not clear.

Arriving on the site of the new job with men, tools and material, the foreman is at once ready to commence work. The material must be checked and compared with the lists. No matter how carefully work has been laid out and material computed, as the work progresses different or additional material becomes necessary. This is obtained by a telephone order from the foreman to the materials man and is likewise delivered by truck within 24 hours. Changes in plans may become necessary, in which case the engineer goes out to the job and approves them before they proceed.

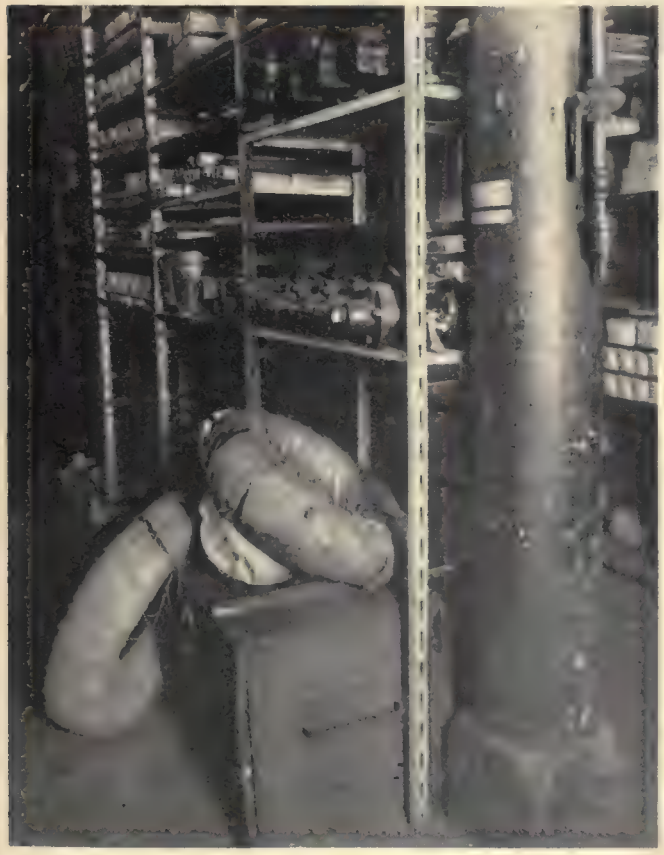
In the substation connection job used as an illustration more than 10,000 ft. of underground and overhead cable were to be installed, in sizes of 1,500,000 and 2,000,000 circ.-mil. Cable is pulled in with a power winch truck, which is ordered by the materials man when wanted. The special tools required for this work, such as cable grips, manhole guards, I-beam cable sheaves and steel pull line are sent out by the materials man from the tool storage room.

The splicing of the underground lead-covered cable is done by the cable splicer and helper, who are summoned by the construction gang foreman when he is ready. Splicing tools and equipment are contained in the cable splicer's cart which is brought to the job. When the splicing, training and racking are completed all cables are protected by wrapping with ¼-in. hemp rope over which a sand and cement mixture is plastered, a protection sufficient to confine the damage of a burn-out to the one cable in which it originates. All cables are identified by tagging in each manhole, at the disconnect switches and in the substation with aluminum tags on which is stamped the individual cable number, such as "71 C," the "71" being the feeder section number and the letter the reference to the particular cable on that section.

The foreman is responsible for the performance of his gang. In the job illustrated the duct line ran under an alley. While cable pulling was in progress the foreman learned that paving of the alley would start within two days. Since this would have blocked his pulling completely, it was necessary to work fourteen hours a day for two days to get out of the way, and although this increased the cost by overtime work, the result was better than being completely blocked from work for a time.

In cutting over cables and making them alive, the power supervisor is consulted on each move, as he is the man directly responsible for the operation of the power system. The construction work completed, it is inspected by the superintendent, who then approves the work order. The foreman makes notes of the date of completion and the quantity of the measuring unit of material used, and returns the work order to the office. All surplus material and scrap are returned to the storehouse for credit and the gang moves on to its next job.

The duty of the cost clerk is to keep detailed costs of each job and so summarize them when work is completed that he can tell instantly how much the job costs in man-hours or money, total or per unit. This work also furnishes an accurate record of dates, material,



Small items are placed in a box and locked—all are tagged carefully

All electrical material is kept in a storehouse with steel shelves arranged for unit piling

special charges and credits. In fact, it becomes the highly condensed record of that job. The unit costs are further tabulated by groups for reference in estimating future jobs of like nature.

The cost system is a simple method of bookkeeping. An account sheet is opened for each work order. On this are entered the labor items as listed in the "Labor Distribution" sheet kept by the timekeeper, material charges, cartage charges, special charges and credits.

The job completed and the foreman's copy of the work order returned is the cue to the cost clerk to close up that account, price out his items, total and summarize them. These summaries are shown in Figs. 8, 9 and 10. The measuring unit shown on the work order is the appropriate one of a number of standard units each of which has a page in the condensed record of unit costs, and on this page, shown in Fig. 11, are entered the unit costs of this job for comparison against all jobs of a similar nature.

There remain to complete the job the making or revision of records by the engineer who handled it and the administrative details of completion such as notification to the auditor, general storekeeper and valuation engineer.

The entire scheme is nothing but an application of specialization, one man or a group of men to do each step in the work, and the whole so co-ordinated that each confines his work to his specialized portion. The advantages which result from this method of organization are several: Each job is given individual attention and occupies a very definite place in the year's program; all details of each job are settled before work is commenced; all work of similar character is done in a similar manner according to standards which have been found best; the gang foreman is provided with full instructions so there is no chance for guesswork by him; working efficiency is very high because the foreman and his men can devote their entire time to the actual construction, unhampered by the necessity to provide material, run errands or tend to other details. As a result all jobs move along faster, more jobs are handled during the year and the efficiency of the department is raised to a point that is hard to excel.

# Truck Sands Bus Routes

By A. M. Lindsay
Superintendent of Rolling Stock Montreal Tramways, Montreal, Canada

MANY heavy grades which must be negotiated in Montreal make it necessary during the winter months, with an abundance of ice and snow, to take every precaution available for safety. The slippery conditions make it necessary to sand bus routes not only on the grades themselves but frequently, under very icy conditions, over the greater part of their length. To carry out this work quickly and economically, the Montreal Tramways built the sand truck illustrated.

The equipment for this sand truck came from discarded parts of bus equipment. An overhauled chassis was taken, and an engine and sand hopper were added. The sand hopper will hold 2½ tons of sand when filled. Under the forward part of this hopper there is room for two compartments, which are used for tools, shovels, etc. The interior sides of the hopper have a slope of 1 in 3 toward the rear end of the truck, which has the distributing valve. The inside is sheet metal.

Sand-spreading truck as used on bus routes by the Montreal Tramways

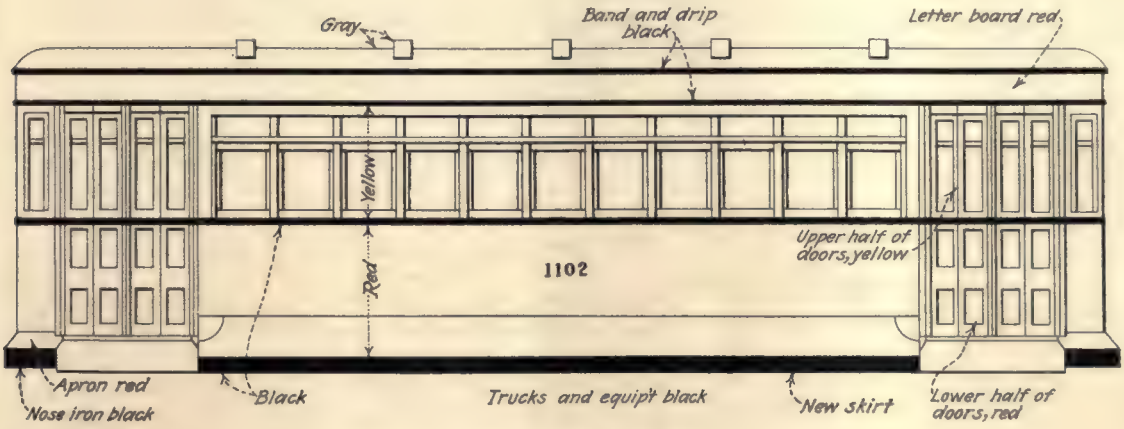
Sand is spread by a saw-steel disk which rotates in a horizontal plane at the end of an extension shaft. This shaft is inclosed completely and runs on ball bearings which are mounted in a steel pipe. An Evinrude Super-Elto outboard marine motor operates the sand-spreading mechanism. Sand or ashes is delivered from the controlling slide valve through a flexible hose to the spreading disk. The top of the disk is provided with eight small hardened steel radial ribs ¼ in. high. These have been found sufficient to give the distribution required.

The width of the road surface which is to be covered can be altered by adjusting the speed of the engine, the height of the radial ribs and the point of delivery on the disk of the sand supply. Cooling water for the Elto engine is drawn from the truck engine radiator and has been found to assist the circulation in the latter. To dampen the exhaust of the spreading engine a large muffler is provided, and to steady the engine under the unusually light load it is made to drive a rotary oil pump against a fixed pressure in the closed return pipe.

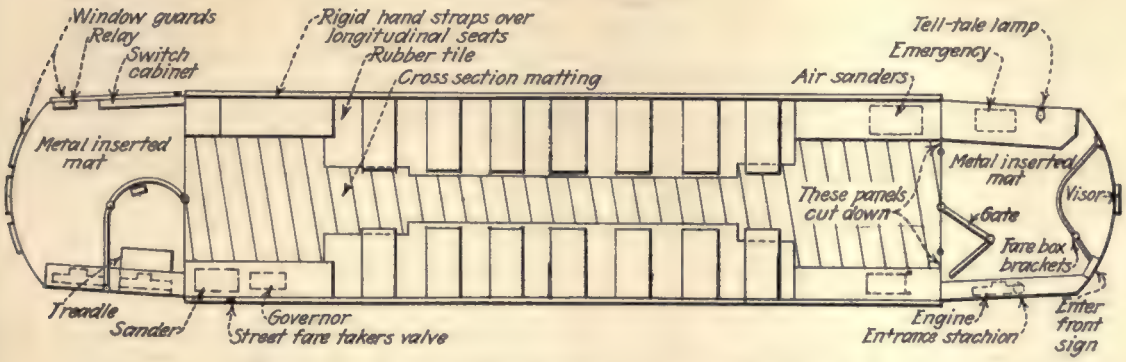
# Remodeling, Repainting and Overhauling Methods in Kansas City

*By R. S. Neal*
**Superintendent of Equipment Kansas City Public Service Company**
**Kansas City, Mo.**

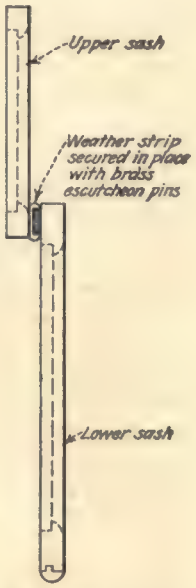
**Rattan seats covered, rubber tiling laid over floor, skirts added to car body, visor over front vestibule center window, new paint scheme applied, weather stripping added to windows, complete overhauling for trucks**




**Color arrangement used for painting the cars**




**Floor plan showing arrangement of composition flooring**




**Weather stripping is installed between the upper and lower sash**

EXTENSIVE remodeling and overhauling of equipment is now being carried out in the shops of the Kansas City Public Service Company. The program includes work on 45 cars. Folding doors are being installed at the front and treadle-operated doors at the rear. Safety air equipment is combined with the electrically operated rear doors. Seats which were previously covered with rattan are being overhauled and maroon Kemi-suede is placed over the rattan. Window latches, lifts and other car fittings are being nickel plated. A floor covering of rubber tiling is being laid and a metal wear-proof flexible matting added in the body of the car. In the vestibule a metal-rubber floor will be installed. Special skirts, Celotex lined, are being attached to the base of the car body to improve the appearance and decrease noises from motors and trucks. Lamp shades of a special type are being used in connection with car lighting changes. A swinging gate and a special metal visor are to be installed on the front vestibule. Cars will be painted inside and out, using a new paint scheme.

The work is being done on a twelve-car-a-week schedule, so that two cars are completed each day. The program for the work includes the placing of the cars in position in the erecting shop for overhauling. Trucks are removed and sent to the truck floor for general overhauling. Special attention is given to gears, bearings, gear cases and other parts so as to eliminate noise. Springs and side and center bearings are being checked up so as to maintain a standard step height.

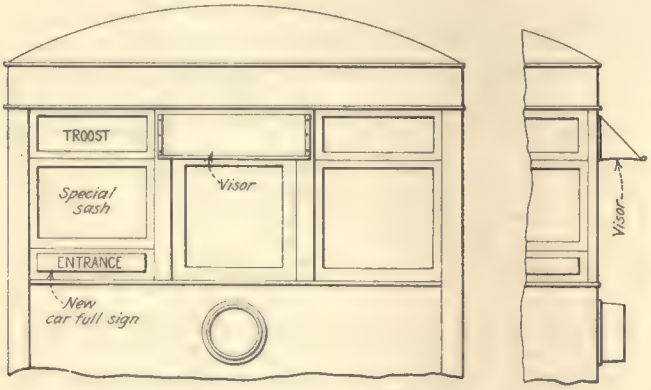
In connection with the body overhauling the lower right-hand front vestibule sash are removed and used for replacement and a special sash is installed in this position in conjunction with a Hunter "Enter-Front"

sign. Other sash are removed from the car, stenciled and then sent to the glazing bench in the mill. After repairs have been made they are sent to the paint room for cleaning and repainting. The sash are reinstalled in the car during the final trimming by the erecting department. Body curtains are removed and sent to the curtain bench for thorough cleaning and repairing. From there they go to the paint shop to be installed when cars are trimmed. Old type khaki motorman's curtains are removed and replaced by new pantasote curtains.

To reduce noise and also to provide greater warmth in the cars weather stripping is placed between the sash, as indicated in an accompanying illustration. All cars are being equipped with Faraday push buttons, and for this installation the pilasters are sent to the mill for reboring. Car roofs are inspected carefully, as it is found that about 25 per cent require recovering.

The practice of the railway is to use monel metal for heater resistors. Where this wire has already been installed in the heaters they are left on the seat frames, but if they are not so equipped they are removed and sent to the electric shop for this change. Seat frames are removed and the backs and cushions stripped from them. Frames are marked with position and car number and sent to the paint shop for painting, after which they are ready to be installed in the car when it is trimmed. Seat backs are sent to the erecting department and cushions are thoroughly dusted and cleaned. Spring plates on the longitudinal seats require considerable care, as many of them are broken. An accompanying sketch shows the method of reworking these plates. Cattle-hair felt ½ in. thick is installed over the rattan and over this a covering of maroon Kemi-suede is placed.

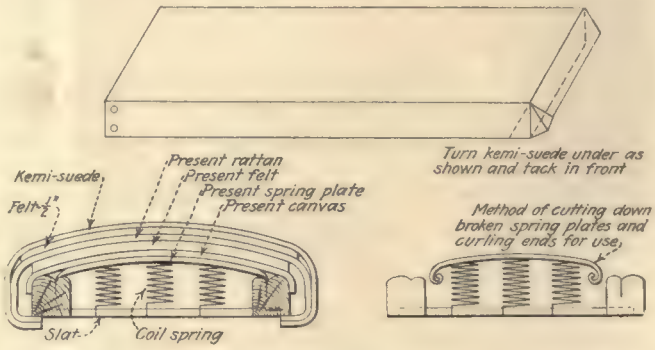
All car trim items such as sash locks, lifts, seat back corner castings, light sockets, etc., are removed, tagged with the car number and sent to the electric shop, where they are nickel plated, buffed and lacquered. Seat back corner castings are returned to the upholstering bench,




At the front end of the car a special window is installed for use with signs and a visor is placed over the front center window

where they are installed in the backs as they are upholstered. Other parts are sent to the paint shop. Body stanchions are removed and sent to the pipe bench to be cut to size for front-entrance use. Controllers are removed and pipes, valves, etc., installed for the use of new safety air equipment. The safety air adapters are installed on the heads of the controllers when these are overhauled.

Motorman's and conductor's railings are removed and sent to the pipe department for necessary repairs. Fare box brackets are added to the large post on the front railing. Also, when stripping the vestibule floor, the individual seat at the right-hand corner of the car is removed. Floor strips in the walkway, in the center of the car body floor, are removed and level floor laid in their place. This requires resurfacing of the trapdoors. If the floor under the seats is very rough, uneven or weak it is replaced. All floor is placed in shape to




**Method used for upholstering seats and cutting down broken spring plates**

make a good surface on which the composition flooring can be laid. An accompanying floor plan shows the arrangement.

The front door, door posts and operating mechanism are removed and all except the doors scrapped. The front door header is removed and sent to the mill for clearance cuts for the upper door shaft arms. This header is reinstalled in its original position. Four new doors equipped with safety rubber buffers are fitted. Front doors are operated by one door engine located on a steel base plate mounted in cabinets over the front door. Rear doors and shafts are removed from the cars and shafts are stripped from the doors and sent to the welding and machine shops for lengthening. Doors are sent to the mill for repairs and reworking. A door engine cabinet, practically the same as that used over the front doors, is installed over the rear doors, in which two door engines are mounted on base plates. The rear exit step is equipped to operate in connection with a treadle device which is installed in the vestibule floor just inside of the exit doors. The rear doors are electrically controlled and air operated.

After the overhauling work is completed the car is placed over a pit in the rear of the paint shop and the composition flooring is laid. At the same time body skirts are installed. They are made of No. 16 gage steel lined with Celotex and hinged to the car bodies. These skirts improve the appearance and decrease truck and motor noises. The metal visor which is installed over the center vestibule window is made of No. 20 black iron and is installed when the cars are trimmed.

Cars remain six days in the paint shop. The first day they are washed inside and out, scraped and sanded. The second day they are primed and puttied on the outside and the ceiling and hoods painted on the inside. The third day they are sanded and touched up on the outside and the first coat of enamel for the inside and outside is put on. The fourth day the second coat of enamel is applied both inside and outside. The fifth day the outside is blocked up for numbers and striped. The inside is touched up and switches and numbers are put on. The next day the car is trimmed for service. An accompanying diagram shows the painting scheme used.

Track pavement on Whitney Avenue, New Haven, laid with granite block stretchers forming the flangeways

# Extensive Annual Track Reconstruction Done by Connecticut Company

**Way maintenance is co-ordinated with municipal paving program. T-rail is standard. Flangeways are formed by granite blocks set in rich concrete. Pavement between rails has extremely low crown**

*By M. M. Johnston*
**Division Engineer Connecticut Company, New Haven**

BELIEVING that careful maintenance of the permanent way is an essential of good electric railway service, the Connecticut Company has adopted a policy of extensive annual track reconstruction. During the past six years 133 miles of track has been rebuilt, a yearly average of slightly more than 22 miles. Last year 21.33 miles of city track and 9.73 miles of interurban track were reconstructed, or slightly more than 31 miles in all. This was the largest amount done in any one year of the company's history. The total mileage reconstructed by the Connecticut Company in 1926 was second only to that of the Chicago Surface Lines, the largest urban electric railway in the world.

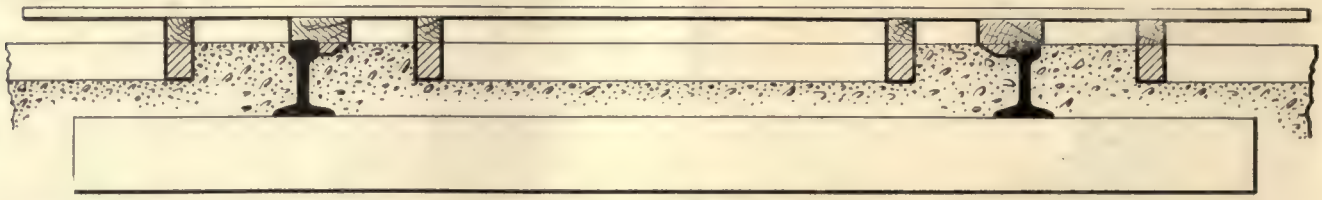
MILEAGE OF TRACK REBUILT BY THE CONNECTICUT COMPANY, BY YEARS

| Year | City | Interurban | Total |
|---|---|---|---|
| 1921 | 12.81 | 5.02 | 17.83 |
| 1922 | 27.73 | 2.91 | 30.64 |
| 1923 | 17.89 | 2.19 | 20.08 |
| 1924 | 14.59 | 5.04 | 19.63 |
| 1925 | 11.17 | 2.83 | 14.00 |
| 1926 | 21.33 | 9.73 | 31.06 |
| Total | 105.52 | 27.72 | 133.24 |
| Average | 17.59 | 4.62 | 22.21 |

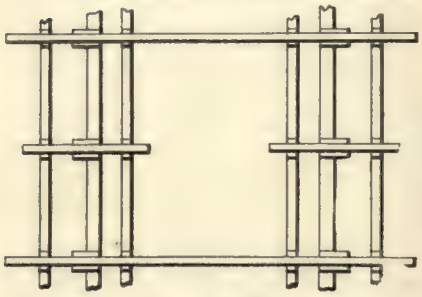
The track rebuilt by the Connecticut Company has varied somewhat from year to year, as shown in the accompanying table.

Under the laws of Connecticut an electric railway is required to pave only 8 in. on each side of the rail. However, if trackwork is done separately from general paving, the entire cost of removing and relaying the pavement in the track area must be borne by the railway. Where there is double track, this sometimes means paying for a strip of pavement 19 ft. in width. For this reason the Connecticut Company makes every effort to co-ordinate its track reconstruction with the paving programs of the various municipalities through which its lines run.

When a paving project is proposed the railway investigates the age and condition of its track in the street and decides whether or not it will last the life of the



Template used for shaping flangeways



Sketch Showing Plan of Form

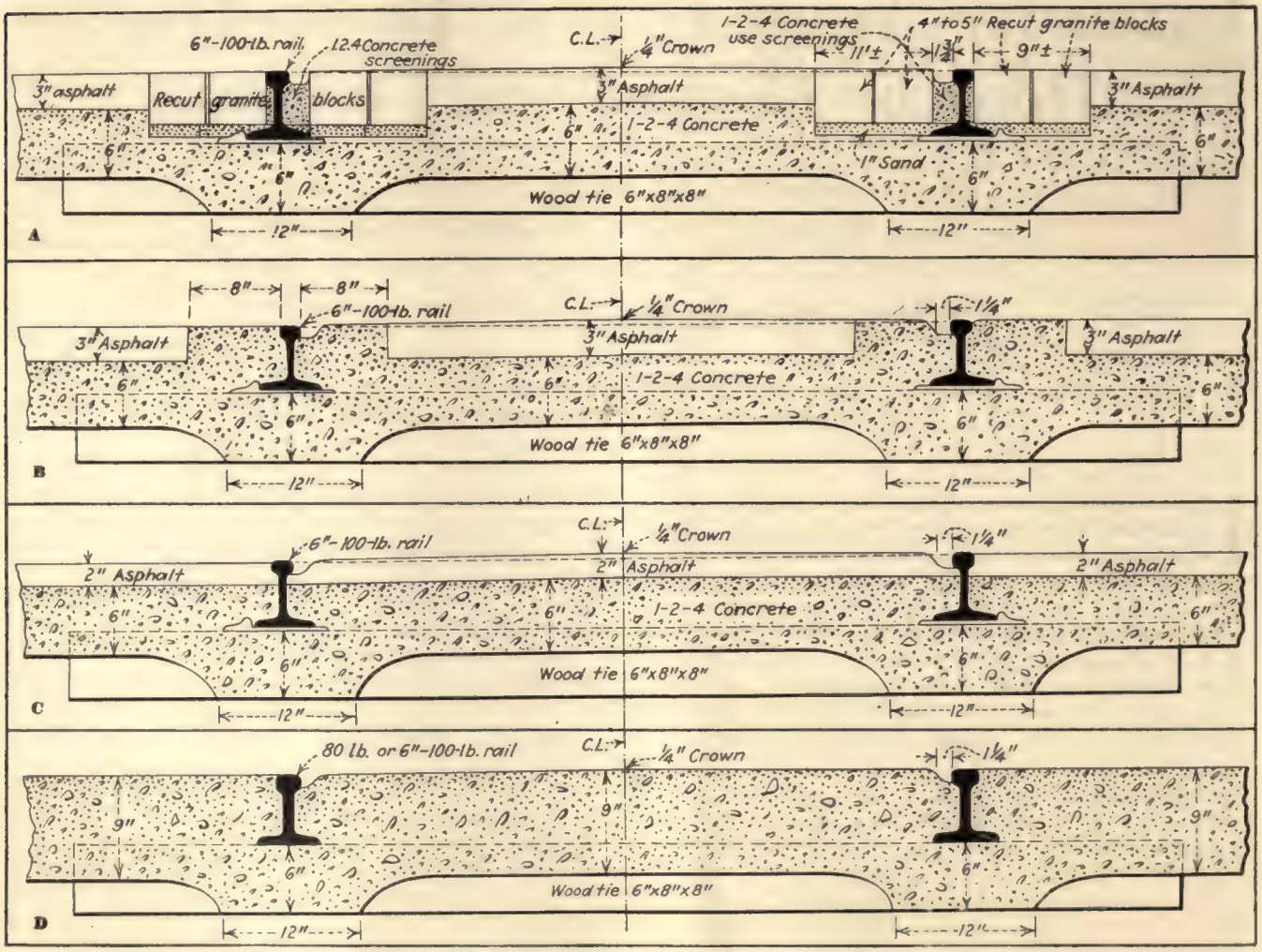
new paving. If it is thought that the existing structure will last that length of time joints are inspected, tightened and welded, defective ties are replaced and the track put in thoroughly good operating condition. When it is believed that the old track will not last the life of the new paving the entire structure is renewed.

Methods of track construction vary somewhat on the different divisions of the Connecticut Company. Those used on the New Haven division are typical of the general practice on the company's large city divisions. At Hartford, however, the soil conditions require a special type of construction.

In track reconstruction the first step after the removal of the old material is to roll the sub-grade. This can be done, of course, only when the old ties are replaced. Whenever new rail is used all old ties are removed and new ones laid. If the old rail is put back only questionable ties are renewed.

Chestnut or oak ties 6 in. x 8 in. x 8 ft. are used in the present standard city track on the New Haven division. Last year the ratio was approximately 70 per cent chestnut ties and 30 per cent oak. They are obtained from Virginia and Pennsylvania as well as locally to some extent. Average cost at the present time is about $1.10 per tie. Treated ties are not used by the Connecticut Company as experience has shown that untreated ties in permanent pavement will last as long in the sandy soil of this region as does the rail. At Hartford steel ties are used thoroughly tamped with crushed stone supported on a special concrete mattress designed to suit the unusually difficult soil conditions.

Tie plates with an inward cant of 1 in 20 to increase




Standard types of low-crown pavement used by the Connecticut Company
(A) Asphalt with granite block stretchers. (B) Asphalt with concrete flangeways. (C) Asphalt with shaped flangeways. (D) Concrete with shaped flangeways.

the area of wheel contact on the rail are used with new rail. A feature of these plates is the staggered notching of the spike holes. An article on this subject was published in ELECTRIC RAILWAY JOURNAL April 5, 1924, page 537.

Rail used on the city divisions is standard 6-in., 100-lb. A.R.A. section except in the Hartford division, where grooved girder rail is used on account of franchise provisions. Both thermit and seam welded joints are used. The cost is approximately the same, about $6.50 per joint. Base plates are used with seam welded joints, as told in the article already referred to. Thermit welded joints are unsupported. In paved track no expansion joints are provided except at special work.

Pavement used with the standard city construction is of five types: (a) Asphalt with granite stretchers on each side of the rail, (b) asphalt with a concrete strip on each side of the rail, (c) solid asphalt laid up to the rail, (d) solid concrete laid up to the rail, (e) solid granite block laid up to the rail. Because of the narrowness of the strip the cost does not vary greatly except in the cost of the granite block construction that averages about $2.35 per foot of single track, this cost representing four strips 8 in. in width. An article dealing with certain features of this construction was published in the ELECTRIC RAILWAY JOURNAL Jan. 31, 1925, on page 194.

When granite blocks are used to form a flangeway, as in structures (a) and (e) of the preceding paragraph, they are set in a dry mixture consisting of one part cement and two parts sand. The blocks are thoroughly rammed home. Between the block and the gage side of the rail a 1-2-3 mixture of concrete using very fine stone is placed. This mixture is thoroughly rammed between the block and the web of the rail and is plastered with a wet mixture consisting of one part sand and two parts of cement. Finally the whole strip is sprayed with water from a hose, which sets up the sand and cement cushion under the blocks and prepares them for grouting.

Sometimes the granite blocks are grouted all the way to the top, and at other times only half way up, depending on the amount of vehicular traffic using the street. Unless this is extremely severe, the grouting is carried only half way and the remaining space is filled in with pitch and gravel. From the railway viewpoint this method is considered preferable as it tends to seal up the track structure better and maintains the bond between rail and pavement.

When asphalt or concrete is used without granite block stretchers the flangeway is made by shaping this material. It is tamped under a special curved template shown in an accompanying sketch. This work is done in 12-ft. sections. A considerable amount of pavement has been laid in this manner and has given satisfactory service.

Only a ¼-in. crown is given to the pavement between rails. Drainage depends largely on the longitudinal grade. At low points, and elsewhere as needed, track drains are installed. These are of cast iron shaped to fit the flat crown. Approaches to these drains are paved with granite block for 3 ft. on each side regardless of the general street paving.

Asphalt paving with 8-in. concrete strip on each side of rail. Flangeway is made by means of template shown on preceding page

Granite blocks are used for pavement 3 ft. each side of track drains regardless of how remainder of street is paved

During three years experience no trouble has been encountered with dirt or ice in these flangeways. Automobiles trying to turn out of tracks do not slew or skid. There is less wear on the pavement on account of less impact caused by vehicles crossing the tracks at right angles. There is also less wear because the flangeway is too narrow to permit wheels to drop down between rails. The low crown design has proved popular with the public in general because it has made the pavement smoother in the track area.

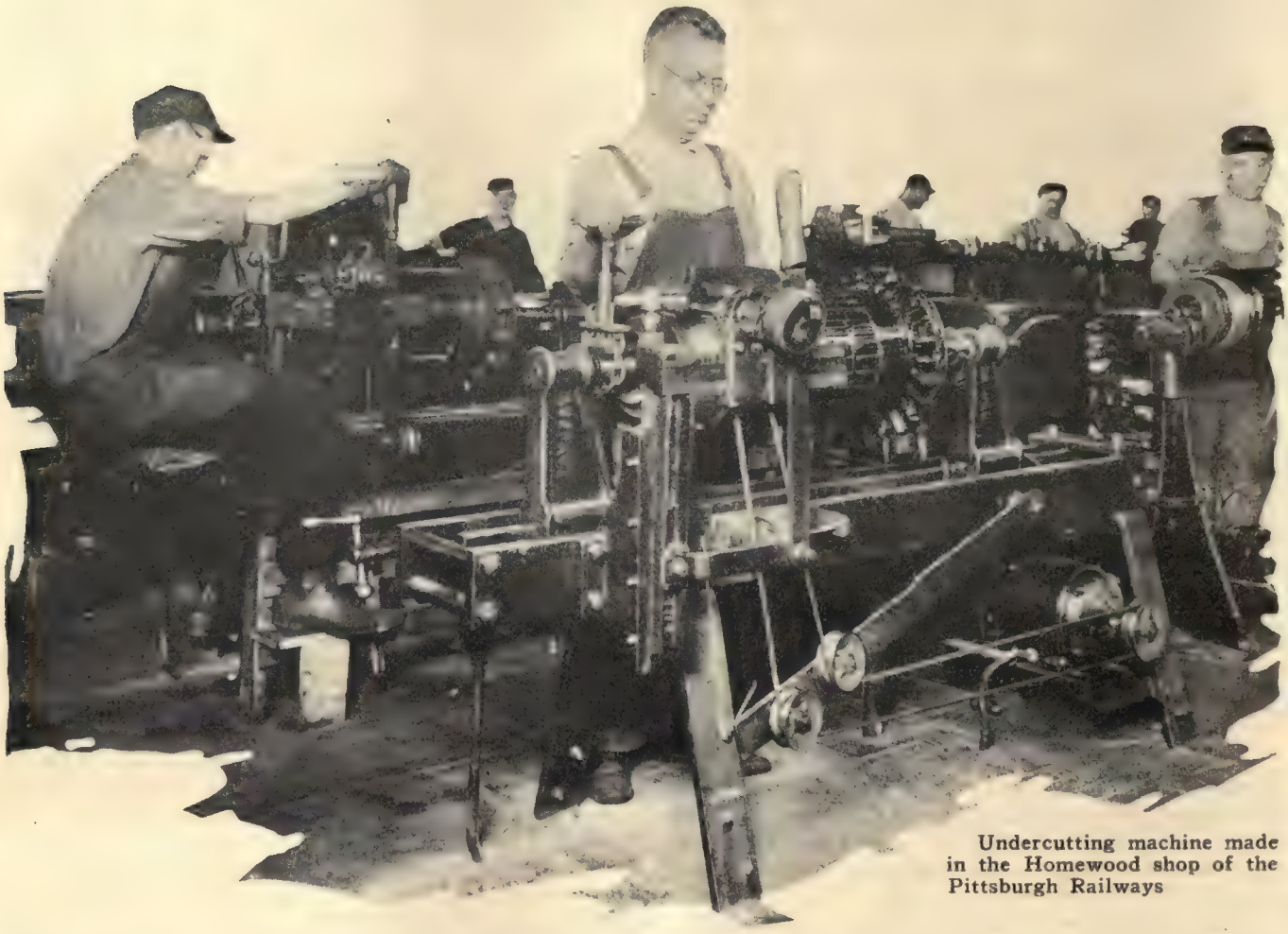
## Data on Painting Car Roofs

THE time between paintings of car roofs was found to vary between six to eighteen months on several Southern railways. New Orleans paints once in eighteen months, Atlanta, Knoxville, Memphis and Birmingham paint once a year and Mobile paints twice a year. Dallas is using Gilsonite paint and has tried Valdura and Asphalt paints. The life of canvas roofs was found to vary up to a maximum of ten years.

# Turning and Slotting of Commutators*

**Modern railway motors are slotted. Mica should be removed carefully from the sides of the slot or the beneficial results from slotting will be lost. Depth of slots should be from 3/64 in. to 5/64 in.**

*By Jesse M. Zimmerman*
Renewal Parts Engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.



Undercutting machine made in the Homewood shop of the Pittsburgh Railways

DIFFERENCES of opinion will always exist regarding the resurfacing of the commutator face by grinding or by turning. Each method has its advantages as well as its disadvantages. The greatest advantage of turning the commutator face is that the time required is very short. The kind of tool to use is not important and each machinist has his favorite tool for each different line of work. However, a diamond pointed tool slightly cupped at the top and set so that it will have sufficient clearance between its side and the commutator face will give very satisfactory results. The cutting edge of the tool should be located slightly above the center line of the armature. One can always feel that the commutator will have a smooth finish if the chips of copper curl up while machining. During the machining the commutator should run at its maximum operating speed. If the speed is too slow the tool will cut the copper deeper than the mica. In order to remove as little copper as necessary the cut should be made very light.

The final finish given the commutator is usually removal of the tool marks by No. 00 sandpaper. This should be done after the undercutting operation. Some repairmen have found that by running the commutator

*This is the eighth of a series of articles on commutators for railway motors. The others were: Choosing Materials for Railway Motor Commutators, published Aug. 21, 1926; Important Considerations in Replacing Commutator Bars, published Oct. 23, 1926; Accurate Machining of the V's of Assembled Commutators Is Essential, published Nov. 20, 1926; Mica V-rings and Bushings Have Important Functions in Commutators, published Dec. 18, 1926; Methods and Equipment for Efficient Assembling of Commutators, published Jan. 15, 1927; Soldering of Railway Motor Commutators, published Feb. 19, 1927, and Preventing Flashovers Is an Important Part of Commutator Maintenance, published March 19, 1927.

of the correct grade are used it will soon take a natural polish if the brush surface has an average finish.

A clean undercut commutator reduces the burning of the copper bars, increases the life of the brushes and practically eliminates flashing

At left, undercutting a commutator with a motor-driven saw at the East Pittsburgh Works of the Westinghouse Electric & Manufacturing Company

Center view, protecting commutators while the armatures are in storage in Homewood shop of the Pittsburgh Railways

At bottom, undercutting commutators with a power-driven saw mounted on a lathe head

at a high speed, using a file to remove the tool marks and later finishing with No. 00 sandpaper, a very smooth finish is obtained. Extreme care must be exercised when using the file not to bear on it too heavily, as it has a tendency to cut very rapidly. This method has the disadvantage of removing too much copper from certain spots, making the commutator surface uneven. Both the sandpaper and the file have a tendency to cut the copper deeper than the mica.

The commutator face may be ground with a special carborundum stone which fits in the tool post of the lathe. It will remove a minimum amount of copper in resurfacing because the cuts made by the stone are very shallow. The last cut will produce a polish without need for file or sandpaper and give a true, smooth surface. The disadvantage of the grinding method is the length of time required. Some operators take a rough machine cut across the commutator surface when it is badly cupped and then use a carborundum stone for finishing. Other railway operators object to the use of the carborundum because the grit from the stone imbeds itself in the copper, causing the brushes to wear rapidly. Careful inspection of the commutator face will show whether this is so.

If the commutator is properly undercut and brushes because it prevents high mica, which is caused by the copper wearing the more rapidly so that the brushes will ride on the mica strips. This causes a burning action between the copper and the brush, which wears away the contact surface. If the burning action continues grooves will be burned completely around the commutator. When the mica is high at one part of the commutator only this burning action will eventually cause a flat spot, which will grow until it will be necessary to resurface and undercut the commutator.

Undercutting is done after the armature has been soldered and banded and the commutator face and neck resurfaced. It should never be done before the commutator has been soldered, as the undercut slot is liable to fill up with solder. Four essentials should be followed when undercutting a commutator. First, it is important that none of the mica remains in the slot. This can be prevented by using a saw which is at least 0.005 in. larger than the mica strip. After the undercutting a heavy hack saw blade should be drawn through

Lathe tool holder and carborundum stone for grinding commutators

each slot to remove any mica which may remain in it. In order to undercut the entire face of the commutator without cutting into the neck the saw must be as small as possible, yet it must be large enough to undercut the commutator to the proper depth.

Commutators should be undercut with a high-speed carbon saw operating at approximately 2,000 r.p.m. This saw should be drawn toward the operator so that he can guide it when starting to cut. It should revolve so that the teeth will strike the bottom of the slot first. This will leave a clean slot on the brush surface.

An undercut commutator should operate from one heavy inspection period to the next. The maximum and minimum depth should be $\frac{3}{64}$ in. and $\frac{1}{64}$ in. respectively. However, the depth can be increased or decreased according to conditions. Should the armature be removed for minor motor repairs the commutator should be inspected carefully and if the mica is getting flush with the copper it should be undercut.

Undercutting is done by either a motor-driven or a belt-driven saw. Where only a few armatures are to be undercut a special knife or a hack saw is sometimes used, but this method is inefficient and slow. On the other hand, where many armatures are to be slotted the undercutting is usually done on a special machine.

An efficient undercutting outfit made in the shops of the Pittsburgh Railways is shown in the accompanying illustration. This machine was made from an old lathe, the saw being belt driven from a ¼-hp. motor. After the commutator has been undercut, in order to polish the brush surface with sandpaper the armature is rotated by placing a belt around the armature connecting it directly to the motor.

Armatures are rotated by belt for polishing the commutator face after undercutting in the shops of the Pittsburgh Railways

Some operators have had good success with an undercutting outfit clamped to the tailstock of the lathe. The portable electric-driven outfits are popular in some of the smaller shops and give good results. The main objection to this type is the difficulty in guiding the saw. When making or purchasing an undercutting machine it is essential that the rotating spindle be supported by a bearing as close to the saw as possible. Any type of stationary undercutting outfit should have a hood and a suction hose to carry off the mica dust.

After the commutator has been undercut the bars have very sharp edges. If left, these will cause arcing and pitting. Once started, arcs between the bars will tend to concentrate on these edges, and may result in a flash. Eventually the bars will be pitted badly. It is important that these sharp edges be rounded off, which can be done by drawing a small three-cornered file through the slot.

After the commutator has been given its final finish, it should be protected from dirt, oil and moisture while the armature is in storage. The Pittsburgh Railways has adopted the scheme of covering the commutator face with several turns of wrapping paper.

## Unnecessary Signal Lights Retard Traffic

HAPHAZARD installation of automatic signal lights not only delays traffic but may actually increase the congestion and danger at street and highway intersections, according to a report compiled by the Albert Russel Erskine Bureau for Street Traffic Research. It is stated by Miller McClintock, director of the bureau, that "automatic stop and go signals are unquestionably an effective means of controlling traffic, and their effectiveness has been proved by many installations that have speeded traffic and reduced accidents in Los Angeles and Chicago, but it should always be borne in mind that traffic signals stop traffic as well as move it, and that wherever a device of this kind is installed it immediately places an automatic limit on the time the intersecting streets may be used. In general, the time along one street is reduced 50 per cent—the signal giving alternate right of way to the streets controlled. Unless the alternate movement is necessitated by a real congestion at the intersection which reduces the opportunity for movement to a point below that permitted by the signal, it is apparent that the control device can have no other effect than to retard traffic flow.

"Stop and go signals should rarely, if ever, be installed for purely safety purposes. The primary purpose of the signal is to start and stop traffic to facilitate movement. Dangerous intersections where traffic conditions do not justify the maintenance of a stop and go signal can best be controlled by the installation of warning signs, and in some cases by the application of a through-stop street rule."

The danger of installing stop and go lights where they are not necessitated lies in the disregard for this type of regulation that grows when motorists are unnecessarily delayed. The willingness of the motoring public to give obedience to an unpoliced signal varies in ratio to the reasonableness of the control exercised.

# Modernizing Work Car Equipment at Salt Lake City

**At a Cost of $1,700 an Electric Locomotive of the Utah Power & Light Company Has Been Completely Revamped and Adapted to Present-Day Conditions**

By F. D. Heiges
Office Engineer Utah Light & Transit Company, Salt Lake City

STRIKING is the contrast between the dilapidated appearance of an old work car battered by years of service and the neat and trim look of the same car fresh from the hands of capable workmen. A transformation of this kind was recently accomplished in the case of an electric locomotive of the Utah Light & Transit Company. Air compressors, trucks, drawbar and electric equipment on the rebuilt vehicle are those that were on the old one. The frame and the body are new. Accompanying illustrations show this car before and after modernization. Reconstruction resulted in a substantial saving to the company, and also had considerable advertising value in that the operation of an up-to-date efficient looking locomotive over the streets of Salt Lake City gives the people the impression that the company is endeavoring to furnish high-class service with the best possible equipment of every kind.

The old locomotive originated about 1909 by the installation of an obsolete street car body on a flat car and motorization of the trucks. Its color was black instead of the standard yellow of the company's other rolling stock.

After the old car had been completely dismantled the trucks were thoroughly overhauled, steam-cleaned and repainted. Upon these, in place of the old wooden frame, was constructed a steel frame 30x6 ft. in size consisting of two 8-in. channels running lengthwise on the outside, four 8-in. steel I-beams running through the center, and two 10-in. arched channel bumper plates forming the ends. The extra height of the 10-in. bumper plates above the 8-in. I-beams permits a 2-in. floor of tongued and grooved wood to be fitted under the ends. Steel strips have been placed along both edges of the floor as a protection to the surface.

This locomotive was built in 1909 by placing an old body on a flat car and motorizing the trucks

A cab was built 8 ft. 6 in. square. This is 13 ft. shorter than the old cab, while the frame itself is 3 ft. shorter. The greater length and narrow width of the old cab hampered the view of the motorman. Having a smaller cab on a shorter frame and flush with it permits the operator to have a clear range of vision on all sides and there is less likelihood of accidents. The center height of the cab is 7½ ft., while the side height is 6½ ft. It is built of steel and wood lined. In all there are ten windows, three on each side and two on each end. All the windows are movable in the new cab, while in the old cab only the center windows were movable. Doors are located at the ends, diagonally opposite each other, with the controller located at the center window on one side. Five electric heaters main-

The same locomotive after being thoroughly overhauled. A new frame and a new cab were installed on the old running gear

tain a comfortable degree of warmth in the cab during cold weather.

This rebuilt locomotive is mounted on 33-in. wheels and is equipped with four Westinghouse 93 motors. The total weight is approximately 40,000 lb. All the wiring has been placed in conduits, another advantage over the old vehicle. The cab of the old locomotive was congested by the presence of air tank and compressor, while on the new locomotive the compressor is underneath the frame and the air tank is outside of the cab along the end wall.

The new body and the reconstruction work cost $1,700. Including the value of the old equipment used, the total valuation is about $8,500 for the vehicle. In utility it is believed to be the equivalent of an $11,000 car. Two locomotives were rebuilt in this way, effecting a saving estimated at $5,000.

# The Readers' Forum

## *Difficulties in Wheel Removal Discussed*

INDIANA, COLUMBUS & EASTERN TRACTION COMPANY
SPRINGFIELD, OHIO, April 4, 1927.

To the Editor:

I have read with considerable interest the article "Wheels Removed and Pressed on Economically," on page 331 of the Feb. 19 issue of ELECTRIC RAILWAY JOURNAL. Just to make it more interesting, I wish to criticise the practice of the Wilkes-Barre & Hazleton Railway, as I think it can be improved upon.

In the first place I do not approve of burning the wheels in order to remove them from axles. I note they have a 400-ton wheel press, and that 36-in. wheels are bored 7 in. and put on at 75 tons, which is standard practice. It is true that it will require probably twice this pressure to remove these wheels after they are worn out, due to the metals of wheel and axle settling into each other under continued pressure and vibration. We have found that a method of removal much cheaper and better than burning is to heat the wheels with a large coal-oil torch. This does not injure the wheels in the least, which is worthy of consideration for the reason that frequently wheels removed from axles are used again for some purpose.

The practice at the I., C. & E. shops is as follows: 100 tons is considered a maximum safe pressure for a 5-in x 9-in. axle. A pressure of 100 tons is first applied; if the wheel does not start, the flame from a torch is applied for about five minutes, and pressure is then again applied, letting the flame still play on the hub of the wheel. If the wheel does not start, a pressure of about 100 tons is kept on until it does start, which is rarely more than seven or eight minutes from the time of first applying the torch.

There is not the slightest danger of injury to case-hardened or heat-treated gears in this process, as the temperature of gear or hub rarely exceeds that of boiling water, or 212 deg. F., while with the cutting process there is some danger of injury to a gear and also to the surface of the axle and journal bearings unless protected thoroughly.

The second criticism I make is that the use of a thrust cylinder and mandrel in putting on wheels is cumbersome, slows up the work and is not at all necessary. If ends of axles are faced off square with the center line and the pressure faces on the wheel press are kept in good order there is no danger of springing an axle if allowable pressures are not exceeded.

F. J. FOOTE,
Superintendent Motor Power and Equipment.

## *Judging Maintenance by Car Failures*

DES MOINES CITY RAILWAY
DES MOINES, IOWA, April 6, 1927.

To the Editor:

The discussion of car failures in ELECTRIC RAILWAY JOURNAL has been very interesting. This is important, first from the point of judging the degree of maintenance and second from the transportation standpoint. The mechanical and transportation departments must be in perfect accord or the car failures per 1,000 miles cannot be kept at a low point. Car failures cause the car riders much discomfort, as no one likes to change to another car during the short ride downtown even in good weather, not to mention in bad weather, when troubles generally happen.

It is only by frequent and thorough overhauling of the equipment and a strict method of inspection that the mechanical department can deliver the service it should. In addition, all car failures must be gone into carefully and steps taken to prevent future ones of the same nature.

Cars on this property are overhauled on a 100,000-mile basis, including painting. They are inspected on a 1,200-mile basis, except the brakes, which are given attention every 600 miles. Oiling of armature and axle bearings is taken care of at every 1,200-mile inspection, while journal bearings and gears are lubricated every 4,800 miles.

There seem to be many different ways on the various properties of classifying a car failure. If we find it necessary to pull a car off before its run has been completed, it is considered a car failure, of which a certain number are chargeable to equipment and a certain number are not chargeable to equipment. Every item is chargeable to equipment except broken glass and collisions.

Although the pull-in of many cars can be prevented by having a man repair cars on the road, we do not believe this to be a satisfactory practice on account of delays and discomfort to passengers while the man is making the repairs. About the only road work we do is to replace burned out lamps. C. R. MCMAHON,
Superintendent of Equipment.

## *Cast Bars Not Drop Forged*

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
WILKINSBURG, PA., April 1, 1927.

To the Editor:

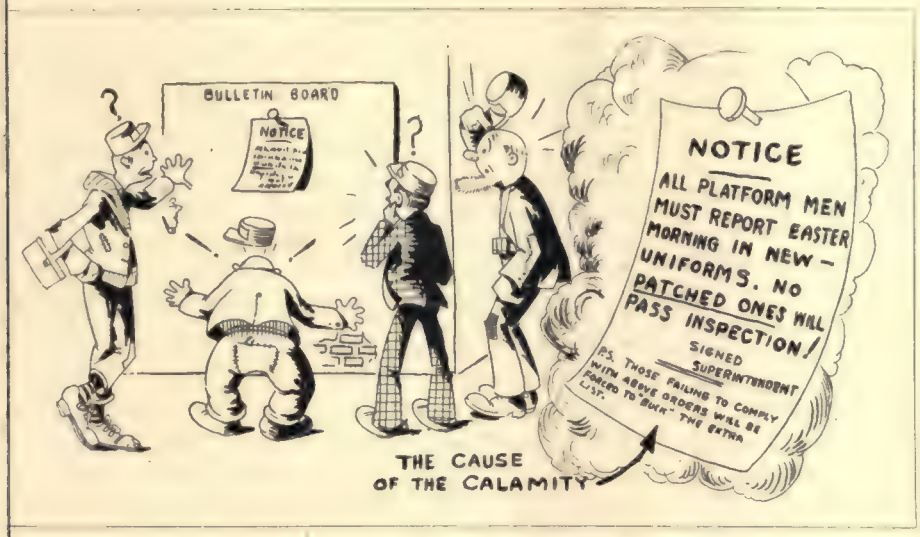
In my article in ELECTRIC RAILWAY JOURNAL for Oct. 23, 1926, one sentence read:

"The Brinell hardness number for cast copper bars which are later 'drop forged' or 'bumped' is from 50 to 55."

The use of the word "drop forged" was somewhat ambiguous. It was not my intention to convey the impression that "drop forged" bars are cast, but it was my intention to state that the Brinell hardness number for cast copper bars which are later "bumped" is from 50 to 55, by the word "bumped" meaning what is sometimes termed "cold pressed bars."

JESSE M. ZIMMERMAN

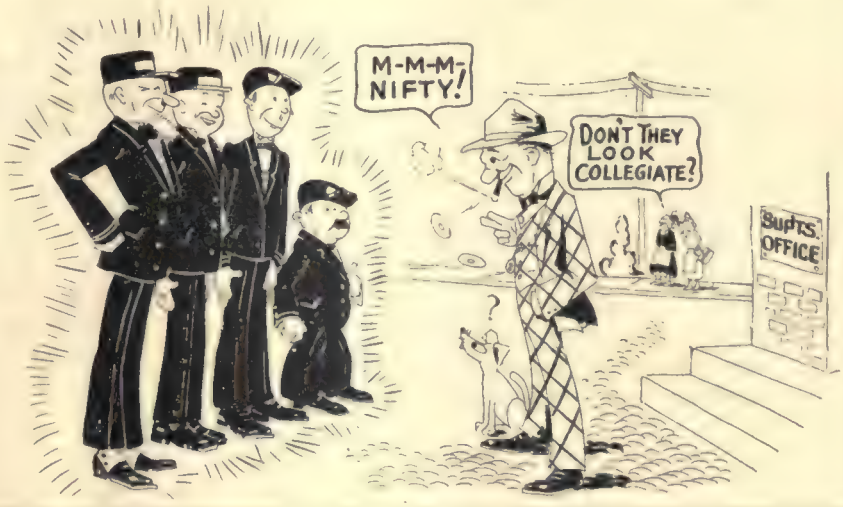
# *Adventures of* Old Man Trouble *on the* Hicksville Railway




*The Annual Easter Inspection— Would Not a Weekly Inspection Be Better?*

Neat platform men are a continual advertisement that the electric railway is a live, vivid part of the community's life. Car operators are in daily contact with the railway's customers. Their neat appearance should be a part of the clean, tidy condition of the cars.

ELECTRIC RAILWAY JOURNAL will be glad to furnish press proofs of this page free of charge for posting on bulletin boards and will supply electrotypes of this series at cost for use in company publications.




J. M. Zimmerman and E. L. Proctor, Westinghouse Electric & Manufacturing Company

# *Fifteen Cash Prizes* Offered to

WITH a desire to stimulate the improvement of railway maintenance methods and to assist in spreading information regarding practices and equipment that are proving of value, ELECTRIC RAILWAY JOURNAL will award three capital prizes of $200, $100 and $50 for the three best maintenance ideas submitted before Aug. 1, 1927. In addition twelve monthly prizes of $25—one each month beginning with the May 21, 1927, issue—will be given. The articles submitted for the capital prizes will be published in the maintenance data sheet section of the issue of ELECTRIC RAILWAY JOURNAL devoted to maintenance and construction. A minimum of $5 will be paid for each article submitted in this competition which is accepted for publication.

The purpose of the competition is to arouse interest among maintenance men in the development and adoption of improved methods for performing routine work, or new methods or fixtures that save labor, time and money for the electric railways.

The prizes will be awarded primarily on the value of the idea presented and its adaptability to the maintenance work of electric railways generally. The form of presentation will be judged only as to the clearness with which the method or device is described and illustrated, and the extent to which information is given which will be needed by other properties interested in using the idea. Fine writing is not necessary. It is the intention to make the prizes available to men engaged in practical maintenance work. Therefore all that is necessary is a concise and clear statement that will be in a form to help other maintenance men. At least one photograph, drawing or sketch is required.

## *Rules for the Competition*

THE competition will be judged and the prizes awarded by a committee consisting of men in the industry intimately associated with the line, rolling stock, and way departments, whose affiliations particularly fit them to pass on the subjects covered in the maintenance data section, and the editor of ELECTRIC RAILWAY JOURNAL. The names of the judges will be published later. All decisions of the judges in making awards or in interpreting the conditions of the contest will be accepted as final. The articles submitted will be judged in accordance with the following conditions:

1 Any employee or official of an operating electric railway or electric railway bus subsidiary may compete for the prizes.

2 Each contestant may submit any number of items he desires, each of which will be judged separately. An individual may win several of the prizes. One item may win both a capital prize and a monthly prize.

3 The author does not necessarily have to be the originator of the idea, but it must be adopted and be in use on the property with which he is connected. The idea submitted may have originated on another property or may have been furnished by a manufacturer. No device or method a description of which, to the knowledge of the contestant or the judges, has been previously published will be eligible for this competition.

4 The competition is not limited to those who originated or developed the idea or apparatus described. Any employee, with the approval of the department head concerned, may submit a maintenance practice or device used on his property. More than one article covering the same device or method will not be accepted, however.

5 Where the management of a railway has a practice of requiring approval of articles sent out for publication such approval must accompany the manuscript. If written approval does not accompany the manuscript it will be assumed that such approval is unnecessary.

# Maintenance Men

6 An article may be submitted by several persons or by a department, and need not be written by the person in whose name it is submitted. The prize will be awarded to the individuals or department whose name appears on the manuscript, and can be distributed among the winners on any basis they may desire. Should there be a tie for any prize the full amount will be awarded for each of the articles involved in the tie.

7 Articles may describe any maintenance practice or device used by any department of a railway such as the maintenance of rolling stock, buses, shop equipment or methods and equipment for overhead line repairs, power distribution and power generation devices, signal work, track and way maintenance, etc.

8 Due to the limited space available in the maintenance data pages, articles submitted for these prizes should be preferably 100 to 200 words in length and should be accompanied by one illustration. Brevity consistent with a proper presentation of necessary information will be given weight in judging articles. In no event should they be longer than 400 words with not more than two illustrations. Articles will be published as promptly as space permits.

9 In rating the various articles the committee will consider the primary value of the method or device as of highest importance. The committee will also consider its practicability, the advantages and economies that are set forth. In rating manuscripts for the capital prizes the committee will also consider the clearness and completeness with which the idea is presented in the original manuscript.

10 All articles must be in the English language and be mailed to the editor of ELECTRIC RAILWAY JOURNAL, Tenth Avenue and 36th Street, New York City. To be eligible for the capital prizes to be awarded the envelope must bear a postmark dated before Aug. 1, 1927. Envelope and manuscript should be marked "Maintenance Competition." Any number of items may be sent in the same envelope. Photographs or sketches should accompany manuscript and be attached thereto. Drawings or sketches may be in pencil, or blue prints will be accepted. Photographs should be protected against damage in mailing. Each item submitted should bear the name or names of the individual or individuals for whom it is submitted and to whom awards are to be made. Articles will be published under the names of individuals or department appearing on the manuscripts. Photographs, sketches and manuscripts should be so marked that should they become separated they can be identified readily.

11 The original manuscripts and illustrations will be turned over to the committee of judges to determine which will receive the capital prizes. These may, however, be published before or after capital prizes are awarded. Monthly prizes will be judged by the committee after the articles are published in the maintenance data section, the best items being selected each month from those appearing in the issue in the month devoted to maintenance and construction.

12 The announcement of the winner each month will be made in the issue devoted to maintenance and construction (the third issue each month) following the one containing the item.

13 Any material submitted may be published at any time after its receipt that the editors of ELECTRIC RAILWAY JOURNAL decide.

14 The winners of the capital prizes—for the best idea $200, for the next best $100, and for the third best $50, will be announced in the annual convention number of ELECTRIC RAILWAY JOURNAL to be published in September, 1927.

15 All articles submitted will become the property of ELECTRIC RAILWAY JOURNAL and no manuscripts will be returned.

# More Comments on Annual Maintenance Issue of March 19

A. E. HAAK, general superintendent the Gray Line Motor Tours, Colorado Springs, Col., writes:

The Maintenance Number of ELECTRIC RAILWAY JOURNAL for March 19 is certainly very interesting. One of the outstanding items in the issue is the review of improved equipment for maintenance operation. It certainly will help the shop forces. We are passing the number to all of our departments and we are sure that they will be benefited greatly by reading all the items covering maintenance suggestions.

H. R. MEYER, renewal parts section Westinghouse Electric & Manufacturing Company, says:

I wish to compliment you on the new maintenance data section which appeared in your Annual Maintenance Number. It will be of unquestionable help in getting before all railway men the things which have been accomplished in an engineering way or from a maintenance standpoint. In a previous issue there was an article by Mr. Williams of the Department of Street Railways, City of Detroit, calling attention to the need for a real good method of correlating engineering information and putting it in such form that it would be of use to electric railway men. It seems to me that the new department which you have started in ELECTRIC RAILWAY JOURNAL will do more toward taking care of this situation than anything that has been done so far.

G. H. STIER, superintendent of rolling stock and buildings, Philadelphia Rapid Transit Company, says in part:

We feel that the step which you have taken in establishing a special maintenance notebook section is an interesting one. The material which you propose to publish in this section will be of particular interest and benefit to all parties interested in the maintenance of electric railway equipment. Having the information presented in a form which will make it possible to bind the sheets together in compact form, while at the same time the copies of the JOURNAL will not be rendered unfit for binding purposes, seems a good plan.

KEITH CONNER of the Jamestown Street Railway, Jamestown, N. Y., says:

Fine! Expect to receive much valuable information through your new department.

C. R. MCMAHON, superintendent of equipment Des Moines City Railway, says:

There are so many good things in the March 19 issue that I hardly know which to mention first, but really I believe that your new section of maintenance data sheets will prove very popular with the readers. It surely will with me. I was interested greatly in the articles by various maintenance superintendents, especially the 100 per cent operation of Chicago surface lines, the article by J. S. McWhirter on car cleaning and the article by A. T. Clark of Baltimore on car painting. The section on improved equipment calls to our attention new devices which might otherwise escape our notice.

C. J. JONAS of the Cincinnati Street Railway writes:

I know of no better way to serve the maintenance men than the JOURNAL as it is now being conducted.

S. L. VAUGHAN, vice-president and general manager Grand Rapids, Grand Haven & Muskegon Railway, said:

I have looked over the March 19 issue very carefully and find some very interesting articles. I think your scheme of publishing monthly maintenance numbers is good.

## *Dick's Enemies Keep Active*

### And Provoke a Crisis

WHILE Dick Prescott, assistant shop superintendent of the Consolidated Railway & Light Company, was engrossed in the work of raising the company's maintenance standards and improving shop practices, those to whom progress is anathema and to whom energy and ability in others always loom as a threat to their own personal prestige became more and more uneasy.

Pete Welsher, shop inspector, saw in Dick's ability not only a definite obstacle to his own ambition but a positive menace to the privileges which he had built up for himself in the shop. He was amazed at the rapidity with which the young superintendent gained knowledge and experience. Being lazy himself, he realized that Dick was ready to pay a price in hard work and devotion to the job with which he was powerless to compete. There loomed before him constantly the fear of being shown up in his true light as a shirker and a loafer.

But what Pete lacked in energy he made up in cunning. He never lost an opportunity among the men of casting aspersions on Dick, but he was careful to do so by inference rather than direct statements. His position as inspector fell in well with these private ends. He nagged the men, found fault with the work, issued orders that were unfair, but always left the impression that he was merely carrying out Dick's instructions. Among his own small clique of cronies he talked continually of an imaginary flood of orders and regulations that were supposed to originate with the assistant superintendent. They, in turn, were quick to pour their own versions of disagreeable things to come into the ears of the worried and dissatisfied men.

That definite trouble would ultimately result was inevitable. Pete was wise enough to know that the carpenter shop would not be healthy for his scheming. Steve White, the foreman, was too alert and too close to his friend Dick. Besides, Dick had worked there as a carpenter's helper when he first came to the Consolidated, and most of the men liked him and were pleased at his rapid promotion. But in the truck shop slow old Bill Johnson was not aware of what was going on until it was too late.

One morning just after Dick had arrived at his office Bill Johnson came in with a worried look on his face.

"Hello, Bill," said Dick pleasantly, "what's on your mind?"

"I got some trouble down at the shop, Prescott; men won't go t'work."

*Electric Railway Journal Maintenance Data Sheet*

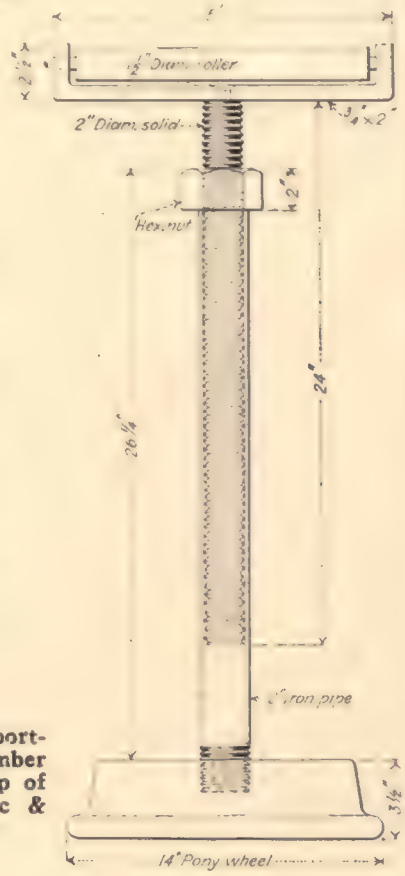
ROLLING STOCK—CARPENTER SHOP—1

# Lumber Roller Supporting Stand

HANDLING of long pieces of lumber during the sawing, planing and milling process in the carpenter shop of the Virginia Electric & Power Company, Richmond, Va., has been simplified greatly by design and adoption of a portable roller supporting stand. It was designed and constructed in the shop under the supervision of the master mechanic, W. J. Hicks.

A piece of 2-in. pipe 26¼ in. long is screwed into the drilled and tapped hub of a 14-in. pony wheel. It projects approximately 24 in. above the face of the wheel. A round steel bar 24 in. long is threaded and installed inside of this pipe through a 2-in. hexagon nut. This nut supports the weight of the roller bracket, roller and rod and rests upon the end of the pipe. On top of this threaded rod is riveted a ¾x2-in. flat bracket designed to support a 1½-in. round roller 15 in. long over all.

This stand is very rugged and it can be transported easily to any part of the shop. It is free to revolve, is 25 in. high and can be adjusted to suit almost any condition by turning the 2-in. hexagon nut. Several of these stands have been built in the company's shop and have proved of great value, particularly in the carpenter department.




Roller stand for supporting long pieces of lumber in the carpenter shop of the Virginia Electric & Power Company

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—ELECTRICAL DIAGRAMS—1

# Field Winding Diagrams for Westinghouse 101B Motor

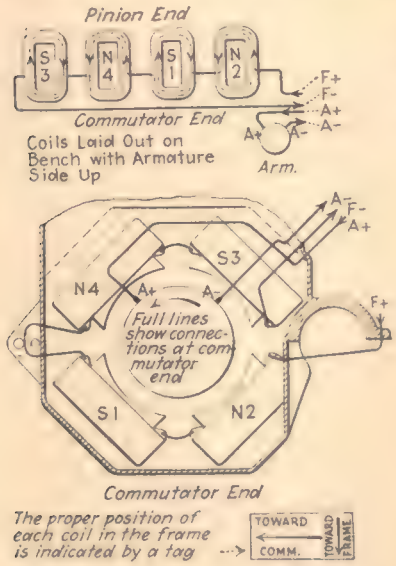
TO MAKE certain that the pole faces of a motor have proper sequence of polarity, it is essential that the coils be installed correctly. The accompanying diagrams are for the Westinghouse type 101B motor. The one on the left is for motors with leads on the axle side and the diagram on the right is for motors with the leads on the suspension side.

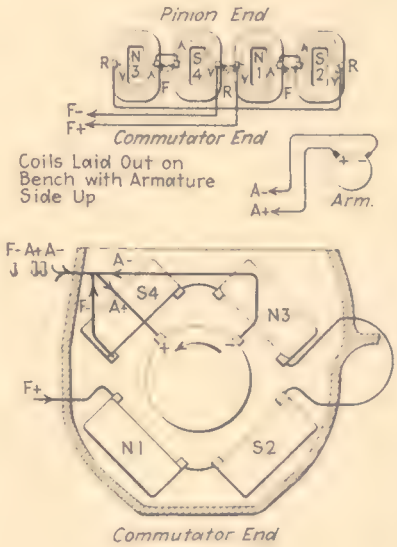
It is the practice of manufacturers to stamp the style number of main field coils on a tag attached to one side of the coil. The proper position of each coil in the frame is also indicated by a tag.

### POLARITY TEST

In the accompanying diagrams
$N$ = north pole.
$S$ = south pole.

With a compass, check the polarity of coils laid out on a bench, also after assembling in the frame. Use a resistor between the trolley connection and coils to give about 5-amp. current, flowing as shown by arrows in the diagram.



*Electric Railway Journal Maintenance Data Sheet*

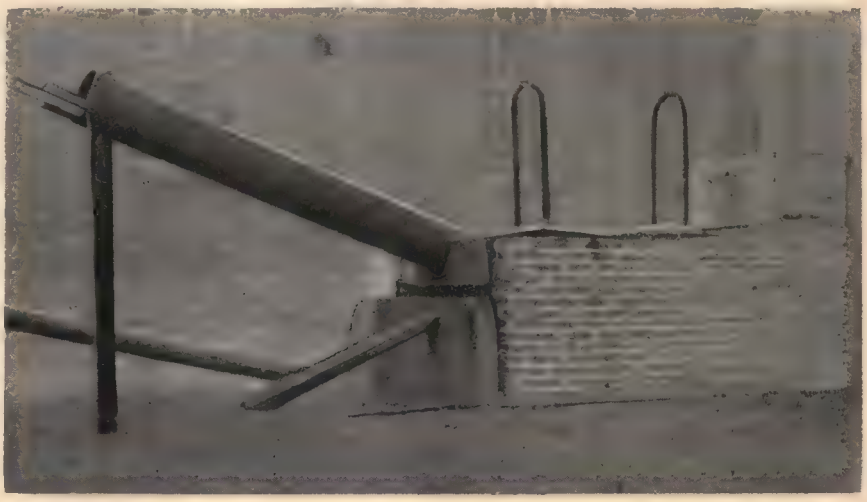
ROLLING STOCK—CARPENTER SHOP—2

# Refuse Used to Generate Steam for Wood Bending

Wood bent after steaming

REFUSE which can be burned easily, such as sawdust, shavings and small pieces of wood and other material which has to be disposed of from the shop of the Reading Transit Company, Reading, Pa., is deposited in a specially constructed fire box, burned, and the heat utilized for the steaming of wood to permit of easy bending.

This fire box, which is made of brick, is about 8 ft. x 6 ft. and 4 ft. high. Extending from one end is a 12-in. galvanized iron pipe of sufficient height to create a suitable draft and imbedded in the chimney base is a 12-in. iron pipe projecting through the fire box at an angle of about 45 deg. This pipe is partially filled with water and the flames surrounding that portion in the fire box soon cause the water to boil. The wood to be steamed is placed inside of the steam pipe. The box has suitable hinged covers and stops.

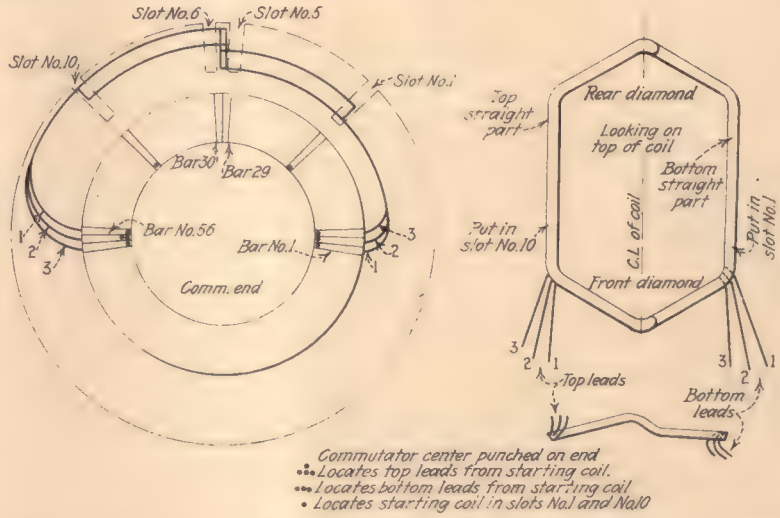


Refuse fire box, chimney and steam pipe for steaming wood to bend

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—ELECTRICAL DIAGRAMS—2

# Armature Winding Diagram for Westinghouse 101B Motor




IT IS very important that the connections of armatures be made correctly when they are rewound. Many railways obtain their winding information from the armature itself as it comes in for repair. Mistakes are sometimes made where information is obtained in this manner. The following information is given out by the Westinghouse Electric & Manufacturing Company and can be relied upon as being correct for the type 101B motor.

1. The center line of the starting coil is on the center line of the tooth between armature slots 5 and 6 and on the center line of the mica between commutator bars Nos. 29 and 30.

2. Starting at bar No. 29 count back clockwise to bar No. 1 and in this bar place lead No. 1 from the bottom leads of the starting coil.

3. Count from bar No. 1 forward counter clockwise to bar No. 56 and in this bar put lead No. 1 from the top leads of the starting coil.

Winding Data

Number of armature slots..... 37
Number of commutator bars.....111
Coils lie in slots No. 1 and No. 10.
Leads connect to bars No. 1 and No. 56.

It is the practice of the manufacturer to center punch commutator bars on the end for convenience in rewinding. The accompanying diagram gives the center punch marks that are standard for this motor.

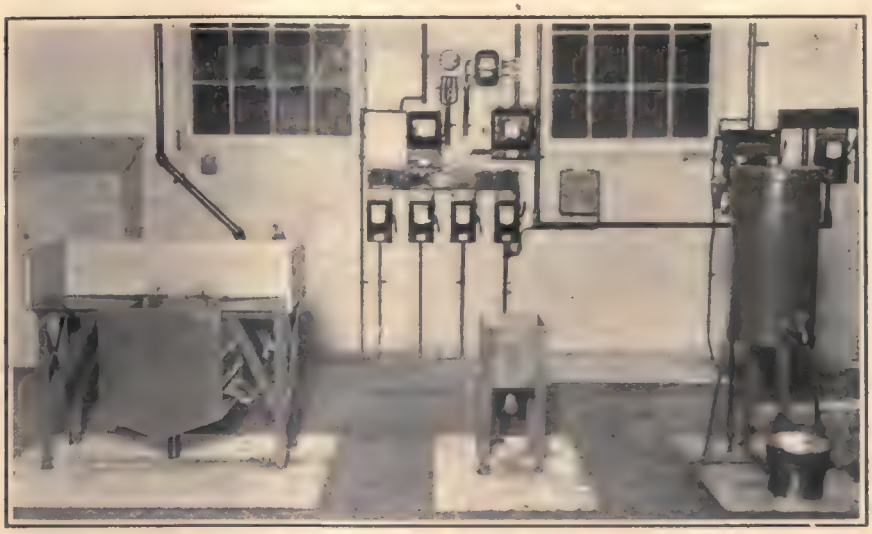
*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—ELECTRICAL—9

## Electrically Heated Equipment for Shop Purposes

HEATING of pinions and lubricating oils used for car journals and motor bearings as well as heating a cleaning solution used for greasy metal car parts is being done effectively with some new equipment at Division 2 carhouse of the Los Angeles Railway, Los Angeles, Cal.

The tank at the left in the illustration, of 24 gal. capacity, is for heating the cleaning compound. It is made of sheet metal thoroughly insulated to retain heat. This class of cleaning was done formerly with gasoline or distillate. The new apparatus eliminates the fire risk and also does the work much more easily.



Equipment for electrically heating cleaning solutions, pinions and oils

The small tank shown in the center of the illustration is for heating pinions. This has a capacity sufficient to cover three pinions at once. After a pinion is immersed the boiling point temperature is maintained for one hour before it is removed. This tank is equipped with heating elements of the immersion type having a load capacity of 6 kw.

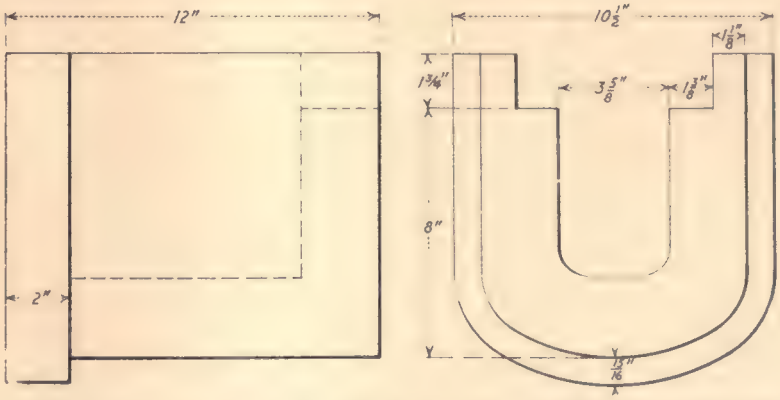
The round tank shown at the extreme right is used to heat oil for lubricating purposes. It is made of metal and has a heat-insulating compound between the inside and outside walls. The electric heating units are of the clamp-on type and are imbedded in the heat insulation. Heat is distributed uniformly to the inside tank, which has a capacity of about 10 gal. Thermostatic control makes it possible to keep the oil at the proper temperature regardless of weather conditions.

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—ELECTRICAL—11

# Pinions Pressed On and Off by Wheel Press

PINIONS are being pressed on and off armature shafts cold in the shop of the Lynchburg Traction & Light Company, Lynchburg, Va., in a wheel press with the aid of a special horseshoe-shaped metal block, designed by Master Mechanic Cochran and built in the shop. This block has a strong collar projection to fit snugly a recess in the tailstock of the press, while an inside shoulder takes the pinion thrust when pressure is applied to the armature shaft during the removal.




Appearance of the horseshoe block used for pressing off pinions in a wheel press in Lynchburg, Va.

To press on a pinion the armature is suspended between the tailstock and the ram, with the commutator end of the shaft placed against the tailstock. The pinion is started on the shaft by hand. One end of a sleeve is placed against the face of the pinion and the other end against the ram. Gradual pressure forces the pinion onto the shaft, the sleeve equalizing the pressure on the pinion surface and eliminating the possibility of injury to the pinion nut threads.

To remove a pinion the armature is swung outside of the tailstock and the pinion inserted into the horseshoe-shaped block with its inside face resting against the shoulder. A copper-tipped steel bar is inserted between the ram and the armature shaft with the copper tip against the shaft. A gradual pressure presses the shaft from the pinion.

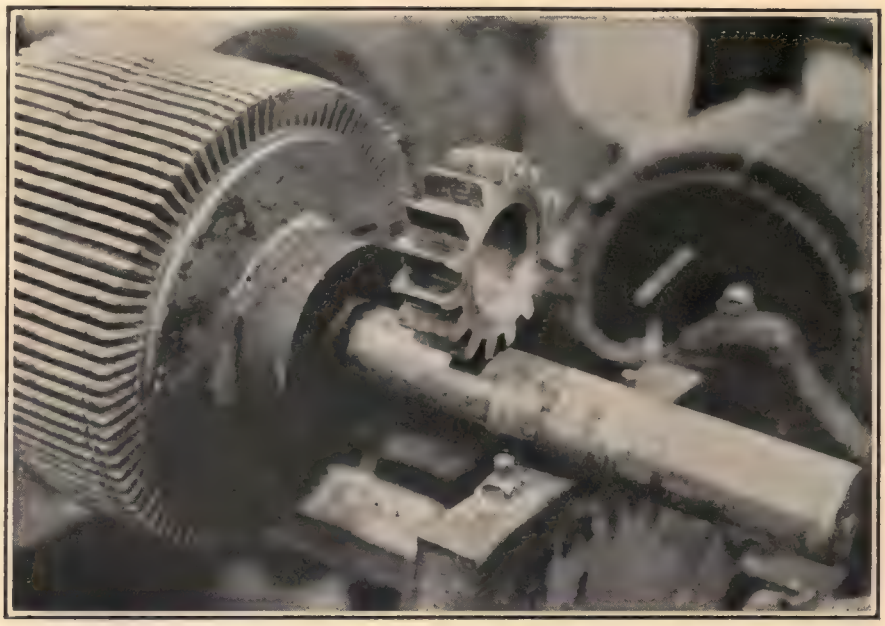
It is understood that with this method not a single pinion has become loose for the past five years.

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—ELECTRICAL—10

# Armature Core Nuts Made from Pinion

ON THE GE-1,000 armatures used by the Market Street Railway, San Francisco, the core-retaining nut is replaced by one made from a discarded pinion. The original nut requires the use of a spanner wrench. With considerable usage the holes become worn to such an extent that the nut cannot be tightened properly. When this condition occurs the nut is scrapped and one made from a portion of a discarded pinion substituted. This new nut, with its many teeth, permits easy use of a pinion wrench, resulting in an exceptionally tight assembly of the armature core. Two such nuts may be made from one ordinary pinion. It is cut in halves on a power hacksaw. The bore is increased to that required on the threaded portion of the shaft and threads are then cut. The use of these nuts on armatures has proved very successful.



Armature assembly retaining nut is made from discarded pinion

Above is shown the type of nut made from half a pinion which replaces a standard retaining nut having holes for application of a spanner wrench.

*Electric Railway Journal Maintenance Data Sheet*

ROLLING STOCK—ELECTRICAL—12

# Stands for Storing Armatures Vertically

STANDS permitting vertical storage of armatures have been developed in the shop of the Wilkes-Barre Railway, Wilkes-Barre, Pa. The stand consists of a cast-iron wheel with a projecting hub, bored to fit the pinion end of the shaft. The circular portion of the base is about 10 in. in diameter and heavy ribs run from the outside flange to the hub. The construction makes a substantial base that is heavy enough so that there is no danger of an armature tipping over. Hubs are bored out to different diameters to fit the various sizes of armature shafts in use by the railway. Due to the adoption of these stands a larger number of armatures can be stored in a given floor space than with the horizontal stands formerly used, and the possibility of foreign particles getting into the windings has been minimized since by vertical storage any particles that might ordinarily be deposited on the armature core will fall off and the end section offers less surface for accumulation of dirt than does the horizontal surface.

Stand with armature in vertical position

# More About Improved Equipment

## for Electric Railway Maintenance

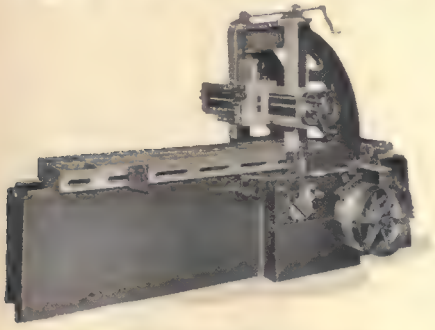
SIXTEEN pages devoted to short articles about improved equipment for maintenance work appeared in the annual maintenance issue of ELECTRIC RAILWAY JOURNAL dated March 19, 1927. Even this amount of space was insufficient to describe all the devices about which information was received. The following pages contain another installment and more will follow in subsequent issues.

Many favorable comments have been received from the readers of this paper as to the value of this section. By illustrating some of the latest tools that can be adapted to electric railway work, those responsible are able to visualize the shortcomings of the particular equipment that they are using and so provide for changes that will put maintenance work on a higher plane and enable it to be done with less cost to the company. The most efficient system is one that uses its cars the greatest proportion of the time. Modern machine tools speed up repairs and so make cars available for service sooner than could otherwise be expected.

### Improved Whitcomb Second-Belt Drive Planer

REED-PRENTICE CORPORATION
Worcester, Mass.

SECOND-BELT drive as used in the planer shown is the result of more than 70 years of study in the design and manufacture of such machines. The bed, which is cast solid on top except where the driving pinion engages with the rack, is of heavy box section having a bearing full length on the floor. The table is also of box construction of unusual width and thickness and is braced at short intervals with ribs to guard against any

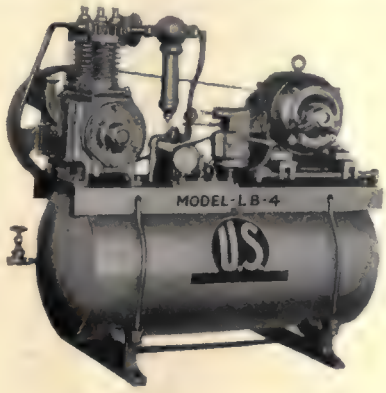


possibility of springing. Provision is made for lubricating the tracks of the bed by a simple oil leveling system, each track being fitted with a series of automatic oil rollers. The housings are of box form, bolted to the bed. By means of the second-belt drive a number of gears in the bed are eliminated. A belt-shifting mechanism shifts the moving belt quickly and noiselessly entirely off the tight pulley before starting to move the other on. The drive pulleys as well as the second-belt pulleys are made of a light-weight aluminum alloy which reduces their inertia and consequently the horse-power required. The cross-rail binder is constructed so that it can be locked to the housing by a simple movement of a lever without the use of wrenches or moving from the operating side of the planer. No wrenches are required for moving the shifter dogs. They are self-locking and are released by finger pressure upon a small lever. A two-speed countershaft, designed to meet the demand for more than one cutting speed, is furnished with the standard equipment. Two different types of motor drive can be used if desired, the plain overhead motor drive and the other belted. With the plain overhead drive a motor and countershaft are mounted on the top of the housing, with a belt from the countershaft pulleys to the main driving pulleys of the machine. The belted motor drive has a self-contained countershaft on the housings. This may be located either on the floor or at the rear of the planer or on a building wall.

### Air Compressor Equipment

U. S. AIR COMPRESSOR COMPANY
Cleveland, Ohio

SPECIAL air compressor equipments for use in automobile repair shops and gas and oil stations have been developed by the U. S. Air Compressor Company. This equipment can be used for the inflation of tires, spraying springs with penetrating oil, cleaning motors, operating air lift, grease racks, gasoline pumps, spray painting under the fenders and in various other manners.

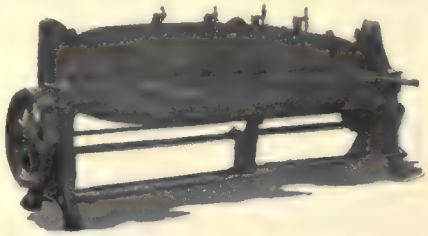



These machines are made in two sizes, the LB-4 and the LB-6. The LB-6 machine is a single-stage, air-cooled unit furnishing a tank pressure of 90 to 125 lb. and has a displacement of 16 cu.ft. of air per minute. The LB-4 machine is a two-stage, air-cooled unit furnishing a tank pressure of 165 to 200 lb. and has a displacement of 12 cu.ft. of air per minute. This constant tank pressure is maintained under all conditions by an automatic controller.

### Power Squaring Shears

PECK, STOW & WILCOX COMPANY
Southington, Conn.

PEXTO power squaring shears are constructed with heavily braced housings designed to maintain the original alignment. The downward thrust is absorbed by a heavy ledge on the housing. These machines will resquare sheets which have been cut roughly in mill shears and cut sheets into strips, trim edges of sheets, cut squares, rectangular or other straight-sided blanks. The knives are of high-carbon crucible steel welded to a soft

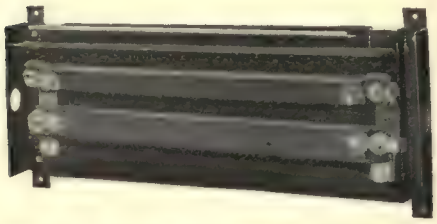


backing. A feature is the manner in which the vertical adjustment of the upper knife bar can be made, so as to retain the nominal cutting length of the shears regardless of the amount the knives are ground. A spring pull-down actuates automatically the movement of the knife bar and serves to clamp the sheets while the cut is being made. The gears are cut from solid castings. A Johnson clutch is furnished with the machine shown and is lubricated internally by grease. All of the bearing surfaces are lubricated thoroughly by means of oil cups. Large dustproof bearings are provided with convenient adjustment for wear. The bed of the machine is designed so as to obtain a quick change of the bed knife in a standing position. Front, back and side gages are furnished. The machine illustrated weighs approximately 2,000 lb. and has a normal cutting length of 52 in.

### Electric Heater

RAILWAY UTILITY COMPANY
Chicago, Ill.

HEATING elements of a nickel-chromium ribbon embedded in a refractory material under hydraulic pressure of 100 tons per lineal foot are



used in the heater shown. It is a two-unit horizontal type heater suitable for paint storage, oil rooms, drying and baking ovens. The embedded heating element is entirely closed in rust-resisting iron or when extreme conditions are to be met, in high temperature sheathing material, with no open ends or mica to break off and collect moisture. All units are fired in a furnace at a temperature of 1,500 deg. F. to vitrify the refractory material and to make it moisture-proof. Every unit is tested for insulation breakdown at 1,500 volts alternating current. Automatic control can be supplied with these heaters, if desired, but ordinarily the three heat switch is sufficient. The Chromalox strips are mounted in a black enameled perforated pressed steel case and are similar in appearance to those in electric heaters used for street car service. Separate Chromalox strips can be obtained for the heating of babbitting furnaces, glue pots, drying ovens, sand driers, etc. The mounting of these units is very simple. Holes are provided in the ends for fastening to a support made from steel angles or straps.

## Silent Blower

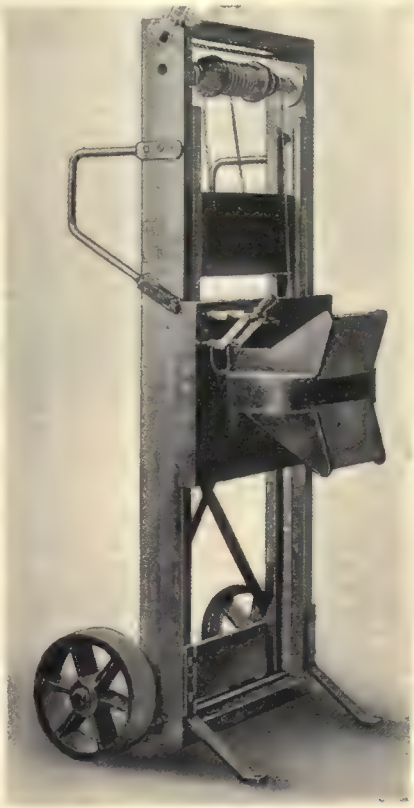
BUFFALO FORGE COMPANY,
Buffalo, N. Y.

PERMANENT alignment of the gears of the Buffalo blower is assured by use of a one-piece cast iron gear case with removable cover. Frequent oiling also is unnecessary. The helical pinion on the fan shaft is a part of the steel shaft itself, making the part strong. The helical type of gear assumes almost noiseless operation. A simple adjustment on the end of the shaft provides the means for taking up wear on the main bearing. Adjustable bearings are used for the shaft end thrust. New Departure ball bearings are furnished throughout. The fan is of the volute type, made of cast iron in two pieces.

## Armature Testing Equipment

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
East Pittsburgh, Pa.

PROVIDING a convenient method of testing railway armatures and one which will detect short circuits and grounds readily, the Westinghouse Electric & Manufacturing Company has placed on the market the armature testing outfit illustrated. This consists of a laminated iron core in which an alternating magnetic flux is set up by connecting the terminals of its exciting coil to a source of alternating current. The core is mounted on a wheeled stand which can be readily moved up to an



armature being repaired and on which tests are to be made. The upright framework has a windlass for raising or lowering the crosshead which supports the laminated core so that the latter can be shoved against the armature as it rests on the usual type of rewinding stand.

When either a direct-current or an alternating-current wave-wound (two-circuit) armature is placed against the face of the laminated core, which is shaped to fit an armature, an alternating flux passes through the armature iron. If the armature winding is correct the electromotive forces generated counterbalance each other and no current passes through the winding. A short-circuited or reversed coil will allow a local current to flow, generating a flux around the slot in which the coil lies.

This testing equipment is suitable only for use with wave-wound (two-circuit) armatures, as the equalizing connections on lap or multiple-wound armatures make the entire winding appear to be short circuited.

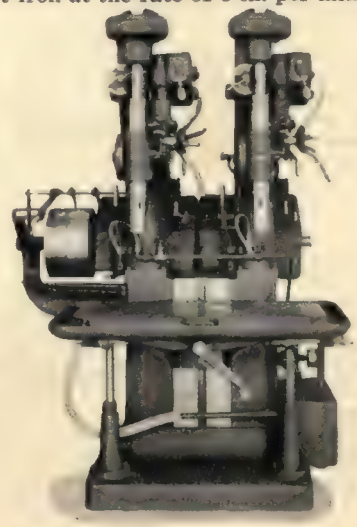
With the exciting coil energized, a piece of metal or a knife blade is passed around the commutator. This short circuits in succession each of the coils that have one side under the testing pole. If there are no faults in the winding a decided spark occurs as the knife blade leaves each of the bars. Absence of a spark between two bars indicates either a short circuit, an open circuit or a reversed coil in the winding.

A short-circuited or reversed coil will also have a local current induced in it which will generate a flux around the slot in which the coil lies. A local flux can be detected by moving a piece of sheet iron, held lightly, over the surface of the armature, so as to bridge from one tooth to the next successively. The local flux caused by a short circuit or reverse connection will attract the piece of iron when it bridges across the slot containing the defective coil. The sheet iron is thus made to vibrate. If no local flux is detected, the fault disclosed by the sparking test is due to an open circuit.

## Two Spindle Box Column Gang Drill Press

BARNES DRILL COMPANY
814-830 Chestnut Street, Rockford, Ill.

DRILLING and tapping can be done readily on the machine illustrated. All gears and their bearings are fully inclosed and are supplied automatically with a continuous flow of oil. There are eight geared speeds and eight geared feeds on each spindle, all of which can be operated independently of one another, and are under the instant control of the operator from the front of the machine. If desired, the gear thread leading feeds may be supplied with slip gears for different pitches for accurate tapping and threading. The transmission gears are cut from special chrome nickel steel, heat treated and tempered, giving high tensile strength. The machine will drive drills up to 1¾ in. through their working limits. If desired, a geared motor drive can be supplied. For the machine shown a 7½-hp. motor, 1,200 r.p.m., is recommended. For tapping, any and all spindles can be furnished with reversing friction clutch gears and automatic reversing mechanism. Spindles can be furnished with back gears, geared feed and automatic stop. This machine will drill a 1½-in. hole in steel at the rate of 3 in. per minute and in cast iron at the rate of 5 in. per minute.



## Standard Geared Head Lathe

REED-PRENTICE CORPORATION
Worcester, Mass.

USE of an all-friction clutch headstock is said to make the geared head lathe shown very rapid in speed changing. The drive is direct from the main crankshaft or motor shaft, to a single pulley running on ball bearings. Start, stop and reverse of the spindle is obtained by a lever on the

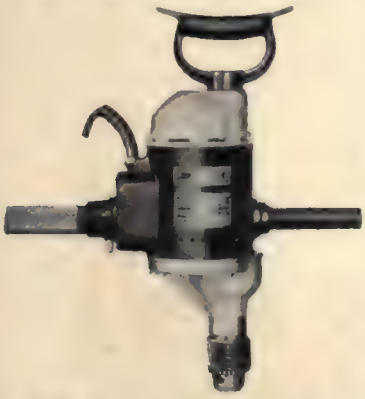
apron which operates a mechanism consisting of three bevel gears and a double friction clutch. The eight spindle speeds are selected by means of three levers on the front of the headstock. A quick-change gear box provides 44 rates of feed and 44 different threads of the most useful pitch. The spindle is made of high-grade steel with journals hardened and ground. Spindle bearings are made of high-grade bronze and are provided with an effective oiling system.

A carriage with rigid and wide bridge and of heavy design is furnished. An apron with a double support is rigidly bolted to the carriage. Lateral adjustment for taper turning is a feature. The standard equipment of the machine consists of a steady rest, large and small face plates, compound rest, regular tool post, quick change gear mechanism, thread-chasing dial and all necessary wrenches.

## Universal Electric Drilling Machine

STANDARD ELECTRIC TOOL COMPANY
1938-46 W. Eighth Street, Cincinnati, Ohio

BALL BEARING design and a special plunger type switch are features of this ½-in. electric drill. This machine is equipped with a Universal motor interchangeable for both a.c. and



d.c. of the same voltage. It is fitted with a cord and plug, combination spade handle and breastplate as shown. A three-jaw geared chuck for straight shank drill bits up to ½ in. is also furnished. It is particularly convenient for car body work in electric railway shops where parts cannot be taken to a stationary drill press.

# American Association News

## Trolley Wire

MEMBERS of the joint committee on standardization of trolley wire met at association headquarters in New York on March 29 to continue the work on specifications for hard-drawn copper and bronze trolley wire.

There were present at this meeting H. J. Horn, W. R. Webster and C. D. Gray, representing the American Society for Testing Materials; W. H. Bassett, representing the A.S.T.M. and the A.E.R.E.A.; C. L. Hancock, J. W. Allen, H. S. Murphy, chairman, and G. C. Hecker, representing the A.E.R.E.A.

Practically the entire meeting was given over to a discussion of the bronze trolley wire specification, considering in detail the requirements for tensile strength and elongation and for the twist test. A number of suggestions were made for compromises on the requirements under discussion and several of these were favorably received. It is proposed to submit these suggestions to proper sub-committees of the two interested associations to obtain further discussion and a decision.

### COMING MEETINGS OF *Electric Railway and Allied Associations*

*April 20-22*—American Society of Civil Engineers, spring meeting, Kenilworth Inn, Asheville, N. C.

*April 26-29*—Southwestern Public Service Association, convention, New Orleans, La.

*April 27-29* — American Welding Society, eighth annual meeting, Engineering Societies Building, New York City.

*May 3-5*—United States Chamber of Commerce, annual meeting, Washington, D. C.

*May 6*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

*May 9*—National Conference on City Planning, Washington, D. C.

*May 31—June 1-2*—Canadian Electric Railway Association, annual convention, Winnipeg, Man.

*June 6-8*—American Association of Engineers, annual convention, Tulsa, Okla.

*June 19-23*—International Street and Interurban Railway Association, annual conference, Copenhagen Denmark.

*June 24-25*—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

*June 29-30*—Central Electric Railway Association, summer meeting, Book-Cadillac Hotel, Detroit, Mich.

*July 27-29*—Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.

*Oct. 3-7*—American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio.

## Traffic and Safety

CLASSIFICATION of accidents was discussed at a meeting of the joint committee on traffic and safety held at Pittsburgh, Pa., April 7. It was the opinion that the classification adopted by the association in 1926 after several years discussion and consideration was so drawn up as to be applicable to any company and could be modified to meet its individual requirements. The only improvement deemed desirable in that classification was some slight simplification. To accomplish this result it was recommended that items 7, 9 and 10 be combined into one item, boarding and alighting accidents. The question of further classification of accidents into the two divisions chargeable and non-chargeable was brought up. It was the general opinion that this would be a very difficult division to make. It was felt that the committee could not, this year, bring about any change in the classification of accidents, but that it should be brought before the convention with the idea that it might be changed next year or the one following.

In order that the general opinion of the industry might be determined as to this it was decided to appoint a sub-committee to draft a questionnaire including two questions relating to changes of classification of accidents and chargeable and non-chargeable accidents, the questionnaire to be sent out by association headquarters. S. W. Baldwin, E. J. Paige and R. W. Emerson were asked to draw up this draft and forward it to the executive secretary.

At the meeting held in New York in January a letter was read from W. H. Boyce asking that ideas for safety posters be submitted to Labert St. Clair. Six sketches were brought in by Mr. Emerson. With slight modifications they were approved. Mr. Emerson suggested that furnishing of such posters is more a function of the National Safety Council and that if the association undertakes such work it would probably be a duplication, even though a small proportion of the street railway companies in the United States are members of the council. However, he stated that at the meeting of the council executive committee to be held in the near future he would bring up the question of the purchase of posters by non-members of the council.

Further, in the matter of a study of traffic surveys of a number of cities C. H. Evenson reported that he had received reports from Atlanta, Washington, Baltimore, St. Louis, Chicago and Detroit and had had a summary made of them. He further suggested that a sub-committee make a further study of this summary, submitting a

report to all the members of the committee for study before the next general committee meeting. All members present concurring, Mr. Emerson, Mr. Paige and Mr. Evenson will act as this sub-committee. Mr. Evenson suggested that a point which should be stressed in the report of the committee was that of urging street railway managers to initiate action looking toward traffic regulation, using the question of safety to the general public as the means of bringing this question before the authorities and the public at large.

Since it is desired to have all reports submitted to the executive committee of the association not later than July 1, it was suggested that a general meeting of the committee be held about June 1, the exact date to be fixed by the co-chairman, the meeting to be held in New York. Members present were C. H. Evenson, chairman; H. K. Bennett, co-chairman; A. J. Fink, R. W. Emerson, E. C. Spring, J. P. Ingle, J. A. Stoll, S. W. Baldwin, E. J. Paige, Samuel Riddle, sponsor, and W. H. Boyce, sponsor.

## W. & S. Special Committee No. 4

CHAIRMAN BAKER of special way and structures committee No. 4 on track ballast and drainage of the Engineering Association called a meeting of his committee in Chicago on March 9 at which there were present C. L. Hawkins, J. H. Haylow, E. J. Archambault and S. Clay Baker.

The progress made by the committee was reviewed and discussed. It was finally agreed that a questionnaire should be sent out to obtain an up-to-date view on standard practice. This questionnaire will probably not go out to the entire membership but only to members of the way and structures committee.

## Special Bulletins Available

Following is a list of special reports being prepared by the Bureau of Information and Service of the American Electric Railway Association:

*Bulletin No. 134: Working Conditions of Electric Railway Trainmen.* A tabulation showing the hours of labor, length and types of run, proportion of straight and swing runs, overtime rates, what constitutes overtime, extra compensation allowed for special types of work, labor turnover, etc., for over 250 operating companies.

*Bulletin No. 134: Working Conditions of Bus Operators.* This bulletin gives for bus operators substantially the same information as is given in Bulletin No. 133 for trainmen—namely, hours of labor, length and types of run, proportion of straight and swing runs, overtime rates, etc. This is the first bulletin which the association has ever prepared on the working conditions of bus men and includes information for 112 bus operations.

*Bulletin No. 135: One-Man Car Operation.* A new compilation of one-man car data containing a complete list of electric railways now operating one-man cars, showing the number of cars operated by each company, record and summary of all cases in which the legality or propriety of operating one-man cars has been attacked, statements of opinion by public regulatory bodies as to the merits of the one-man car. It also gives a comparison of the results of operation of one-man and two-man cars, including the comparative accident record of each. This bulletin brings up to date and supersedes the data contained in Bulletin No. 95: "Recent Developments in One-Man Car Operation."

*Bulletin No. 136: Electric Railways Operating Motor Bus Lines.* A new, revised list of more than 350 electric railways now operating motor buses, showing for each company the number of miles of bus route, number, type and seating capacity of buses, fare charged and transfer privileges to railway lines.

In addition to the above the following supplements have been prepared:

Supplement No. 19 to City and Interurban Fare Bulletins Nos. 41 and 42.
Supplement No. 1 to Bulletin No. 129: Wages of Trainmen.
Supplement No. 1 to Bulletin No. 130: Wages of Bus Men.
Cost of Living Studies (Bulletin No. 137).

## Sub-Committee on Depreciation

ACTION to be taken by the American Electric Railway Association in connection with the forthcoming hearing on depreciation before the Interstate Commerce Commission on May 23 was discussed at a meeting of the sub-committee on depreciation held in Chicago on April 6 and 7. Those present at the meeting included the following: R. R. Bradley, Chicago; Thomas Conway, Jr., Philadelphia; J. H. Hanna, Washington, D. C.; Frank Karr, Los Angeles; L. R. Nash, Boston; J. A. Knowlton, Springfield, Ill.; B. E. Bramble, Chicago; F. W. Doolittle, New York; Richard Sachse, Los Angeles; S. M. Haskins, Los Angeles; W. H. Sawyer, East St. Louis, Ill.; R. S. Torgerson, Chicago; C. H. Allen, Chicago; A. W. Brady, Anderson, Ind.; Leo Loeb, New York; H. M. Sowle, New York; Charles Gordon, New York; F. A. Newton, New York; F. E. Stout, Chicago; C. D. Jackson, New York; P. J. Lucey, Chicago; B. W. Warren, Boston; C. L. S. Tingley, Philadelphia; C. E. Thompson, Chicago; A. S. Richey, Worcester, Mass.; B. F. Weadock, New York; Harry Reid, New York; L. S. Storrs, New York; C. D. Cass, Waterloo, Iowa.

One outstanding problem before the committee is the collection of the information necessary to show what would actually be the result of a depreciation order for electric railways by the Interstate Commerce Commission similar to that issued for steam railroads. Since the compilation of this data may prove difficult to some properties, a selected list of companies which are typical of various classes are to be specially urged to co-operate in supplying the needed information.

In general, the committee agreed that the retroactive feature of the steam road depreciation order and the arbitrary requirement of setting up a fixed reserve for depreciation each month regardless of business conditions would be particularly harmful to the electric railway industry. In representing the industry before the commission it is the intention of the committee to speak for the association, without waiving the right of individual properties to present their own cases. It was the expressed hope of the committee, however, that properties which expect to present their own cases during the hearing will notify the committee of their intention. Because of the short time available before the date set for the hearing a sub-committee consisting of Chairman J. H. Hanna, R. R. Bradley, Thomas Conway, Jr., and L. S. Storrs was appointed to seek a postponment of the hearing date from the commission.

# News of Other Associations

## Mr. Johnson Discusses Transportation

SPEAKING before the Birney Club of St. Louis on April 4 H. A. Johnson, general manager Chicago Rapid Transit Company, said that transportation needs of the country although greater than ever before are being met more adequately than they have ever been since our early ancestors discovered the wheel as a method of transport, and expressed as the greatest need of the hour a more complete co-ordination of transportation agencies so that wasteful duplication of service may be eliminated; so that the steam railroad, the electric railway and the motor bus are each put to the use for which it is best adapted, both from standpoint of service to the public and economical operation.

We are only on the threshold of a properly co-ordinated system of transportation but we are making progress. There is a general tendency to absorption of small and unreliable transportation companies incapable of rendering good service by large and responsible companies. The task of co-ordinating our transportation agencies is one of such magnitude that it will require time and infinite work to bring it about, but it will be done and it rests with those whose life work is transportation to do it.

We are making progress in use of the motor coach. In 1921 there were only 21 electric railway companies operating 73 motor coaches with 35 miles of route; whereas in September, 1926, they operated 6,469 coaches over 14,907 miles of route. This increase is at a rate much faster than that at which independent lines have grown.

Mr. Johnson also said that it is significant that traffic in American cities in general is increasing more rapidly in the suburbs than in the city itself and that in every large city the commuting zone was extended with every improvement in transportation service. The only limit which the city worker recognizes in the distance between his home and his place of work is the time consumed in his daily travel.

Mr. Johnson, who has given considerable study to transportation problems both here and abroad, said that one of the greatest problems to be met in the development of comprehensive transportation plans for cities was the difficulty of getting enabling legislation, because the attitude of the average man toward some new proposal which he does not completely understand is usually to vote "no."

# The News of the Industry

## New St. Louis Petition Provides for Flat Eight-Cent Fare

Receiver Rolla Wells of the United Railways, St. Louis, Mo., filed a petition on April 9 with the Missouri Public Service Commission at Jefferson City asking again for an increase in rates. The latest request is for a flat fare of 8 cents. The increase is on the basis of an estimated $75,000,000 valuation for the properties. A former application, pending before the commission for many months, sought a fare of 8 cents or two tokens for 15 cents. The company was able to charge that fare base between Feb. 7 and Feb. 28 under the protection of a temporary restraining order issued by the federal court.

In the new petition it is set forth that during the brief period in which the higher rate of fare was in effect the company collected $48,420 more than for a similar period in 1926. The petition further recites that the original request for higher fares filed with the commission on June 4, 1926, was based on a physical valuation of the road's properties of $51,781,348. The petition said:

> The fare prayed for in the application filed June 4, 1926, would not, in the light of experience with that rate of fare and in view of the fact that the number of revenue passengers has been steadily falling off during the three months of 1927, produce sufficient revenue to pay operating costs, taxes and depreciation and yield a fair return on the present value of the property devoted to public use.
>
> An increase in the rate of adult fare to 8 cents cash and two for 15 cents would yield only about $870,000 additional revenue annually, which would represent a net income available for returns of only $75,000,000, and only 5.77 per cent on the Public Service Commission's 1919 valuation plus additions and betterments.
>
> To provide sufficient revenue to yield at least a part of a fair return on the present value of the property it will be necessary to increase the adult fares to 8 cents, which will, in the opinion of the petitioners, predicated upon the experience of 7½-cent fares, produce no more than $2,000,000 additional revenue during the year of 1927, compared with 1926, and represent an annual return of only 6 per cent on the present value of the properties and less than 8 per cent on the commission's 1919 valuation.

An audit completed recently by the Missouri Public Service Commission disclosed that the railway suffered a net loss of $225,000 during 1925 and the first ten months of 1926. The commission will hear the company's petition on April 22.

## Injunction Action by Duluth Street Railway Upheld

In a decision by Justice Holmes the United States Supreme Court April 11 affirmed the ruling of the lower court which had granted an injunction to the Duluth Street Railway, Duluth, Minn., in a fare controversy with the Railroad and Warehouse Commission of Minnesota.

The railway applied for higher fares and the state commission fixed its value for rate-making purposes, but entered an order that instead of granting permission to charge a straight 6-cent fare, as the company had sought, it might charge a 6-cent cash fare but should sell five tokens for 25 cents. The company immediately secured an injunction in the federal court.

The state commission appealed to the United States Supreme Court, on the ground, among others, that the procedure followed by the railway was erroneous in that the Minnesota State law provides a method of appeal from decisions of the Railroad and Warehouse Commission and that this remedy had not been exhausted, therefore the company could not rightfully apply to the federal courts for relief. The commission also pleaded that the action of the company was premature in that it sought an injunction before testing out the rates ordered by the commission.

The Supreme Court holds that the company had a right to choose the court to which it would appeal for relief and therefore that its action in asking an injunction of the federal district court was proper. The high court did not discuss the question of whether the suit was premature, and it permits the decision of the district court in enjoining the rates fixed by the state commission to stand.

## Few Indiana Utility Measures Become Law

Following adjournment of the Indiana Legislature and the signing by the Governor of bills he favors, only three bills pertaining directly to public utilities and how they shall be regulated succeeded in becoming laws.

Senate bill No. 178 gives any one the right to appeal to circuit or superior court from any ruling of the Indiana Public Service Commission. The appeal shall be taken thirty days after the ruling is made.

Senate bill No. 171 amends the public service commission act of 1913 by adding a provision that, if the commission finds, on inquiry, that salaries paid by utilities are excessive or that more persons are employed than necessary, or that any unjustified expense is being incurred, the commission shall designate such items and not take them into account in fixing rates.

Senate bill No. 124 amends the utilities act of 1915 by omitting from it the proviso which required a report to be made to the Public Service Commission and its approval obtained before the earnings of a municipal plant that had accumulated a sinking fund sufficient to pay its debt could be turned into the general fund.

A joint resolution was passed requesting the Congress to enact legislation denying jurisdiction to federal courts to hear utility rate cases until the legal remedies offered by the state courts are exhausted.

## Columbia Carries On Without Car Service

Operation of street cars in Columbia, S. C., suspended on March 11, has not yet been resumed. The matter of suspension of service may find its way into the courts of the state. On petition of a citizen, the South Carolina Railroad Commission ordered the Columbia Railway, Gas & Electric Company to show cause why it had suspended operation without permission. The railway failed to show cause, whereupon the commission ordered it to resume operations within a stipulated time or else pay a fine. Then the company filed an appeal for further hearing before the commission, this appeal serving to stay the execution of the "pay a fine or resume service" order, and at the same time asked that it be permitted to discontinue the service permanently.

The Railroad Commission, giving as its opinion that "the unregulated unrestricted system of 'jitney' transportation has utterly destroyed the railway system in Columbia," handed down an order permitting permanent discontinuance of service and at the same time revoked the order to pay a fine or resume service. Now the question has arisen of the right of the commission to grant permission to suspend service and the matter may get into the courts on that angle. As is shown by the order, the 10-cent "jitneys" continue to be a most disturbing factor in the transportation problems of the city. They offer keen competition to buses operated on a regular schedule and over a definite route. The jitneys, operated without route or schedule, carry passengers at the same rate as the buses and take them direct to their door or office.

## Another Move by City in Rochester Railway Valuation

The long-pending suit of the city of Rochester for a new valuation of the lines of the New York State Railways in Rochester came to the fore again with announcement by Corporation Counsel Platt that, on behalf of the city, he would ask court permission to inspect the books of the railway under which the valuation under the service-at-cost contract was fixed.

The move is considered preliminary to establishing whether the appraisers fixed the valuation according to regular procedure. The railway has denied the city the right to inspect its books and a court order is now sought. When the case will actually come to trial is still uncertain. The litigation, in which the city is striving to obtain a lower valuation for the service-at-cost contract in the hope of gaining a fare reduction, has been hanging fire three years.

## One-Man Car Bill Killed in Pennsylvania

Legislation against the one-man car in Pennsylvania is dead for this session. The House has killed the one-man car bill. There was very little public support for the bill and the wonder was that the measure got as far as it did. Newspaper comment, particularly in Philadelphia and Pittsburgh, was decidedly against the measure. The extent of the appreciation by the newspapers of the value of the one-man car was, perhaps, nowhere better expressed than by the Pittsburgh *Gazette-Times*. That paper said:

> Substantial improvement of electric railway service in populous places and reduction of the rates of fare apparently depend entirely on lowering the costs of transportation. The one-man car is less expensive to operate than the two-man car. A greater number of cars on a route without increase of the wage account is possible where the newer system is in use. This opens up a prospect not unpleasing to car riders.

## Franchise Acceptance Formalities Being Concluded in Kansas City

The Kansas City Public Service Company, Kansas City, Mo., during the week ended April 2, completed its formal acceptance of the terms of the new railway franchise awarded to it by the city officials on March 21. The form of the acceptance document was approved by the City Council, and it was mailed to Chicago on March 21 to the First Trust & Savings Bank, corporate trustees under the new mortgage on the local properties.

Under the provisions of the franchise ordinance as passed, the public service company had twenty days in which to accept or reject the franchise. The acceptance now awaits only the signature of William G. Woolfolk, president of the Kansas City Public Service Company, before being filed with the City Council. The ordinance, according to Powell C. Groner, chief counsel for the company, would become effective on April 10. The new fare schedule will then be filed with the State Public Service Commission as required by law. It is pointed out, however, that the commission has ruled that the new fare schedules will not become effective until 30 days after approval by commission, unless good reason is shown for putting them into effect earlier.

## Six Cents and Other Requests Asked in London

A 6-cent fare with five tickets for a quarter for a period of two years is requested by the London Street Railway, London, Ont. This petition is part of a proposal to the city which states that at the end of the two-year period the railway would arrange to revise the fares as necessity might dictate with leave to appeal to the Ontario Railway & Municipal Board by either party.

The proposals include an exclusive perpetual franchise with all controversial clauses, including the use of one-man cars, to be referable to the board. The company agrees to pay the cost of track foundations but believes the city should assume obligations for surface paving. A clause provides for the purchase of the railway and bus lines by the city on six months notice, the value of the system to be decided by arbitration. The company also seeks exemption from all taxation except the school tax. If an agreement is reached the company will spend $300,000 within five years on general improvements.

The temporary agreement which authorized the London Street Railway to charge a 5-cent fare expired on April 1. The railway is now really operating under the old agreement whereby it is compelled to sell seven unlimited and nine limited tickets for a quarter.

## Investigation of International Accounts

William R. Pooley of the New York Public Service Commission has reserved decision on the application of the municipal authorities of Buffalo, N. Y., for permission to examine the books of the International Railway, for certain figures to be used in opposition to the company's request for a 10-cent fare in Buffalo. Henry W. Killeen, of counsel for the International, says the application is a mere device for delaying the proceedings or for seeking information to be used in the United States District Court litigation.

Testifying before the commission, John J. Schmunk, vice-president of Mitten Management, Inc., in charge of accounts, said that the amount of half-fares collected is far below the amount estimated by the commission's experts when fixing the 8-cent fare which now is in effect in Buffalo.

Dr. Milo R. Maltbie, acting for the city, will oppose the 10-cent fare request of the International.

## Electrification and Allied Projects Cost $55,500,000

Beautification of Chicago's downtown lake front through electrification of its suburban divisions, lowering of track levels in Grant Park, erection of a new suburban terminal at Randolph Street, and completion of the vast Markham freight yards on the south side of the city and similar undertakings in the last six years, represents a total investment by the Illinois Central Railroad to date of more than $55,500,000, according to a recent statement by L. A. Downs, president. During the current year, he said, an additional $4,600,000 will be spent in continuance of this work. Electric operation of all Illinois Central suburban trains in Chicago was begun last August in compliance with the terms of an ordinance for the development of the city's lake front.

Plans for the construction of another monumental new Union station by the Illinois Central on the site of the present Central station at Roosevelt Road and Michigan Avenue, have been retarded by the lack of definite decision as to terminal building by other railroads entering the city from the south. The Illinois Central hopes to induce the lines now using the Dearborn, La Salle and Grand Central terminals to join with it in the centralized terminal project to cost about $20,000,000.

## Fearful of Future Fares in San Francisco

A controversy has arisen over the effect on fares of a proposed bond issue election early next year for extensions of the Municipal Railway, San Francisco. One faction declares that an 8-cent fare, superseding the present 5-cent rate, will be the ultimate outcome. City officials deny this indignantly.

Adolph Uhl, manager of the City Efficiency League, declared that the extensions under the proposed $3,500,000 bond issue will produce only $444,000 revenue a year, and that there will be a total deficit of $393,000 on the lines before the bond redemption is added, and that when this redemption is finally added the deficit will total $520,000 a year.

"This means an 8-cent fare," was Mr. Uhl's deduction.

Nelson Eckart, assistant city engineer, retorted in this fashion:

> Including bond redemption the first year is ridiculous. As every one knows, bond redemption doesn't begin until the fifth year. To say that the line into the Sunset district will produce only $130,000 yearly is also ridiculous. The B line into Richmond district, which is comparable to the Sunset line, took in $308,000 in 1915, its first year, and $520,000 last year.
>
> The Sunset line will not only take in considerably more than $130,000 the first year, but its receipts will increase even faster than those of the B line did.
>
> If San Francisco is to grow it must have transportation. The railroad bond issue will give transportation to districts which are partially built and which need only transportation to become densely settled.
>
> But even if the lines proposed all lost money the first year they would be worth building.

In addition to extensions on five lines it is proposed to erect a car repair shop and a garage. Purchase of twenty buses for use in the Sunset and Potrero sections also is recommended.

The recommendations involve the building of 11.54 miles of track at a cost of $1,382,000, acquisition of 47 new cars at a cost of $799,000, purchase of $150,000 worth of buses and expenditure of $1,660,000 for land and auxiliary establishments.

The city engineer recommends that no further extensions be approved until 1929, when franchises for 126 miles of track of the Market Street and California Street Railway systems expire.

## St. Louis Expert Will Report on New York Subways

Charles Edward Smith, St. Louis, Mo., has been engaged by the city of New York to study the subway lines and the possible consolidation of them with the existing rapid transit systems. He is now in New York City to remain four or five months. Mr. Smith, who is well known in the West as engineering counsel to public utilities, is head of a firm of consulting engineers, with offices in St. Louis, and for some time has been conducting a survey on the development of the rapid transit system for that city. He has had wide experience in railroad construction, in municipal developments and in government service. His appointment was authorized by the Board of Estimate and Apportionment a month ago. An appropriation of $25,000 was made in connection with the appointment.

### Fare Issues

Dr. Delox F. Wilcox, traction expert, has been assisting the city of Los Angeles, Cal., in opposing higher fares for the Los Angeles Railway. The City Council authorized his services on March 28. The increase sought by the Los Angeles Railway is from 5 to 7 cents. The city is scheduled to start presentation of its case on May 17 before the State Railroad Commission.

Meanwhile the Pacific Electric Railway fare case is again before the Railroad Commission following a hearing on April 5. A compromise was effected recently between attorneys representing the Pacific Electric Railway and Los Angeles and the neighboring cities whereby Glendale and Burbank will accept a temporary schedule of reduced single and round-trip fares and a 20 per cent increase in the price of commutation books. The Pacific Electric Railway is seeking a 7-cent local fare and a 20 per cent increase in the interurban rate. Supplemental to its application for a fare increase the railway filed an amended petition which sought as an experimental measure a general reduction in all interurban rates. This petition was referred to in the ELECTRIC RAILWAY JOURNAL, issue of March 19, page 548.

### Chattanooga Commission Receives Transit Plan

A transit plan prepared for the city of Chattanooga, Tenn., which would mean a considerable expenditure for the Tennessee Electric Power Company was passed recently to the City Commission. The plan was prepared by Harland Bartholomew, expert city planner.

B. C. Edgar, vice-president and general manager of the Tennessee Electric Power Company, said that his company would not approve the plan at the present time. One section, he explained, dealt with the proposed changes in present railway routes and the other with additional lines for the future development of the system. The report recommended the removal of all tracks from Broad to Chestnut Streets. This, Mr. Edgar declared, would not be satisfactory with the present width of Chestnut, but might later if the street were widened. He further called attention to a recommendation favoring removal of all tracks from the Walnut Street bridge. This change would not be favored by the company, he said, because it would entail a lot of expense and would not accomplish any improvement. In his opinion the recommendations in Mr. Bartholomew's plan would call for the expenditure of $1,662,000.

### Confer on New Jersey Canal Bed

The desire of the Public Service Railway, Newark, N. J., to take over and operate the abandoned bed of the Morris Canal for rapid transit lines was expressed again by Thomas N. McCarter, president of the road, at the first of a series of conferences between representatives of the city and the Public Service Railway on the proposed use of this canal bed. Other conferees were John L. O'Toole, vice-president in charge of public relations; Corporation Counsel Congleton, acting director of the department of public affairs, and Chief Engineer Costello. If equitable terms can be worked out, Public Service will consider financing the subway construction. The company would prefer to operate the bed as an open-cut subway from Plane Street northwest to the city line, as originally proposed, the section from Plane Street to the new Pennsylvania Railroad to be covered. Mr. McCarter said, however, the corporation will be ready to go along on plans for covering the canal bed at other points if found advisable.

# Worm-Drive Car Successful at Springfield, Mass., Test

**New Unit There Operates Successfully in Trial Run Attended by Railway Men, Manufacturers and Others—Car Noiseless and Remarkably Smooth**

IN THE presence of visiting railway executives, manufacturer's representatives, city and state officials and newspaper men, the experimental worm-drive car built for the Springfield Street Railway, Springfield, Mass., by the Wason Manufacturing Company was thoroughly tested on April 14 under various track conditions.

The car, described in detail in the ELECTRIC RAILWAY JOURNAL for March 26, exceeded in several respects the expectations of its designers. Construction was completed only a few hours before the demonstration run, but the unit operated perfectly in all of its details. Members of the American Electric Railway Engineering Association committee on noise reduction, headed by Chairman H. S. Williams, were present to ride the car during its demonstration run. Mr. Williams planned to make a series of noise tests of the new car in comparison with standard cars on the property.

#### CAR PERFORMS WELL IN SERVICE

The Timken worm-drive axles gave smooth and rapid acceleration. The Westinghouse motors, mounted longitudinally in the truck frame and driving the axles through Spicer universal joints and a short drive shaft, operated smoothly and handled grades and curves successfully. A remarkable smoothness and quietness around curves was attributable to the differential drive in the axles. Reduction of unsprung weight by mounting the motors in the truck frame instead of on the axles eliminated pounding over special work and reduced the usual shock and vibration of ordinary operation over special work to a mere metallic click. The electrically controlled automotive type brakes with diaphragms mounted on the axles and with internal expanding shoes inside brake drums bolted to the wheels made possible such high rates of deceleration that it is anticipated the brake diaphragms will need to be made smaller to reduce the braking power. The automotive type hand brake was found ample to slide the wheels on dry rail.

Good riding qualities of the radical truck design proved to be one of the outstanding features of the demonstration. Noise of operation was limited to the hum produced by the wheel flanges in grooved rail, the trolley wheel and motor armatures. Gear noise was absent and brakes were entirely silent. It is expected that even greater quietness will be obtained by the use of rubber pads on the wheel webs.

All those who witnessed the demonstration declared that only a service test long enough to determine the strength and wearing features of the design is necessary before the car can be considered successful. After the finishing touches of trimming and painting are completed, work that is expected to take about ten days, the car will be placed in regular operation in Springfield.

### Rapid Transit Operating Agreement Talk in Philadelphia

Thomas E. Mitten, chairman of the board of directors of the Philadelphia Rapid Transit Company, Philadelphia, Pa., is willing to enter into negotiations with the city for leasing the Frankford Elevated Railway and the Broad Street subway jointly.

This fact was made known by Mr. Mitten in a letter sent by him to Mayor Kendrick in reply to the Mayor's inquiry as to the best terms the P.R.T. could offer to the city for operation of the Frankford Elevated Railway after the expiration of the present lease.

Under the original Frankford L agreement, which was dated May 5, 1922, the term of the lease was fixed for five years, beginning Nov. 5, 1922, and expiring Nov. 4, 1927, with an option reserved to the city, but not to the company, to extend the term to July 1, 1957, by notifying the company to that effect not later than six months prior to the expiration of the five years term. That is, the city must notify the company of its intention by May 5, 1927, which is just about a month off. In order to decide what the city shall do in the matter Mayor Kendrick about a week ago wrote to Mr. Mitten, reminding him that May 5 is rapidly approaching, and requesting him to state the best terms under which the company would continue to operate the Frankford L in view of the fact that the proposed amended L lease had not received the approval of the commission.

There has been a decided opinion that the city should negotiate with the P.R.T. for an agreement that would embrace both the Frankford L and the Broad Street tube, which will soon be ready for operation. On the other hand, some persons are inclined to favor separate agreements for the two lines.

## How One Manager of a Small City System Sees It

The Poughkeepsie & Wappingers Falls Electric Railway, Poughkeepsie, N. Y., carries 10,000 persons about the city daily, and suddenly to cast aside the railway and substitute buses would be disaster. This statement was made by George Wells, superintendent of the lines, who stressed the need of every up-to-date city keeping its railway lines and augmenting them wherever necessary with buses. He was answering an inquiry from one of the local newspapers. His comments on the changing aspects of transportation were especially pertinent. He said in part:

When movies came, some people thought that actors would no longer be wanted. When victrolas were invented, many expected that singers and orchestras would not be in demand. When radios were invented, people asked if concert halls and public auditoriums were to be torn down.

As a matter of fact, actors are wanted everywhere—likewise public speakers and orchestras and bands. Telephones have not superseded the telegraph.

Since the advent of automobiles and buses, everyone is riding more. In the past year, more people traveled on steam roads, on trolley roads, in automobiles and buses than did the year before.

Buses are a new and useful means of transportation and electric railways are adopting them. They do not take the place of electric railways in the majority of cases, but supplement them.

Some electric railways have failed. Many bus lines have failed, and when railways have not paid it almost invariably follows that buses over the same routes do not pay unless the railway failed on account of poor management or tax burdens or both.

A well-established and well-regulated railway is essential to any city of any consequence, and just because a few towns of lesser importance have allowed their railway systems to slip away from them, it should not follow that a modern, prosperous and promising city like Poughkeepsie should think of giving up its up-to-date, well-established and well-organized railway system and replace it with buses that are still in the experimental stage. Is any modern and self-respecting city allowing such a thing to happen? Not any, that I know of. Many are adding buses but not giving up their trolley system. Many cities are even paying the railways where they have failed, in order to keep them going. Many have canceled paying debts, taxes, etc., in order to help their trolley companies get on their feet again. They will not allow the railways to go. Those who have are regretting it.

Electric railways are here to stay. They are beyond the experimental stage.

Buses are here to stay, but they are still in the experimental stage.

There are many failures of bus ventures all over the country, and it would be very unwise indiscriminately to abandon tracks for buses at this period of uncertainty.

This company carries 10,000 passengers daily. It is a great responsibility, but the service seldom fails. The system has been built up through many years of practice and large expenditures of money. Suddenly to abandon this system for a form of transportation where many more vehicles would be required to do the same work might bring disaster upon the community.

## Railway Issue in Oakland's Mayoralty Fight

Oakland, Cal., is in the midst of a lively spring election campaign. Frank Colbourn, one of the arbiters who two years ago awarded employees of the Key System Transit Corporation a higher wage scale, is running for Mayor. His opponent is J. L. Davie. One of the issues of the campaign is the 7-cent fare, which Mr. Colbourn is accused of having made imperative for the company in consequence of the expense saddled on it by the wage advance. It is a minor issue, though, and is not attracting much attention.

Clothes don't make the man, but they help

## A Fitting Process

"Hey, those trousers bag in the seat!"

"Make those sleeves a little longer!"

"No, I don't want cuffs on those pants!"

These and similar expressions came from the office of J. Frank Johnson, vice-president and general manager of the Community Traction Company recently, arousing the curosity of car company visitors.

A peep inside the room disclosed a dozen men in various stages of dishabille, some of them with less of clothing than the greased challenger of the Catalina Island swim, but lacking the beautiful symmetry of this challenger.

Some were on chairs trying on trousers. Others were pulling and hauling at stubborn trouser legs from less advantageous places on the floor of the office. Others tried on vests and coats.

Paunches that demanded the utmost skill of expert tailors for proper fitting, shoulders round and shoulders square, victims of obesity and malnutrition—a gathering of sufficient variety in shape and size to drive the ordinary tailor woozy—all were there being fitted.

Outside several scores of other men waited, listening to the buzz of chatter that came from Vice-President Johnson's room.

The occasion was the fitting of Community Traction motormen, conductors and bus drivers with the new olive drab whipcord uniforms which have been ordered for them. Superintendent Emery had charge of the job.

"We want to have 'em all fitted out so they can appear as a unit in the new uniforms in a few days," said Mr. Emery, puffing vigorously and perspiring. "But at the present rate of speed we will have 'em all ready to make their bow to the public soon. I cannot give a definite date. It all depends on the outcome of this fitting process. But it will be either the 10th or the 15th of this month," he said.

The new uniforms have the new army roll collar. Hats to match also have been provided and heads of the several hundred motormen, conductors and bus drivers are furnishing another interesting phase of the outfitting process.—*Toledo Blade.*

## Hartford Loses Tax Suit to Connecticut Company

The city of Hartford, Conn., has lost its suit against the Connecticut Company to collect a yearly tax of 2 per cent of the gross fares. The railway paid this 2 per cent tax from 1894 to 1923, and the total for the period amounted to $677,000. Judge Newell Jennings in his finding said that the tax was illegal. The ancient ruling of the City Council of Hartford reads in the records as follows:

The directors shall pay into the city treasury each year 2 per cent of the annual gross receipts of fares as evidenced by such reports, until such time as the state law shall be so changed as to provide that taxes of street railways shall be paid locally instead of to the state, and in case of such change in the law, the company shall pay annually to the city any deficiency in the amount of the said taxes from the amount of the said 2 per cent on the receipts of the aforesaid.

The counsel for the railway contended that the levy was a tax and therefore illegal. The city contended the payments annually were for the privilege of electrifying lines in 1894 under the Tucker grant. To support the railway Judge Jennings stated: "I find as a fact, upon all evidence, that this levy was and is a tax."

## Important New Subway Station Opened in New York

The New York Transit Commission, the Queensboro Chamber of Commerce and several civic organizations arranged an elaborate program to celebrate the opening of the Seventh Avenue (Times Square) station of the Queensboro subway on March 14. The new station, in conjunction with the Interborough Seventh Avenue line and the Times Square-Grand Central station shuttle line of the Interborough, consists of four levels. It is one of the most commodious subway stations in the world and will relieve the present congestion at Grand Central, where the former terminus of the Queensboro line is located. There is a Queensboro station at Fifth Avenue and 42d Street, but because of traffic conditions most of the passengers who use the Queensboro line board and leave trains at Grand Central. A considerable portion of this traffic transfers from the Seventh Avenue line of the Interborough and reaches Grand Central by shuttle. All of this traffic will be handled in the new four-level station at Seventh Avenue and 41st Street.

The entire extension of the Queensboro subway from Grand Central Station westward under 42d Street, to the rear of the Public Library, thence under 41st Street and west to Eighth Avenue, with the Seventh Avenue connection with the west side subway of the I.R.T., was constructed by the Powers-Kennedy Contracting Corporation. The contract price for the entire extension was $3,867,138. Of this, approximately $1,500,000 has been expended for the section from Fifth Avenue to Eighth Avenue, including the cost of the station and its equipment. Immediately after the exercises the Interborough put in effect a regular schedule, approved by the Transit Commission.

## $300,000 Improvement Program for Beaver Valley

Probably in no other section does the paving question have so many ramifications as in the Beaver Valley, where the management of the Beaver Valley Traction Company, New Brighton, Pa., must deal with the official body of some 26 incorporated boroughs or towns, varying in size from 700 to 18,000 population and each one urging its particular program of street improvement, which invariably involves a portion of the lines. Here, as elsewhere, the company seeks relief from the paving burden which belongs to the horse car days when Dobbin did the damage. This is realized by many of the officials in the various towns and the many other favorable factors in the company's public relationship are rapidly breaking down all prejudice and the management sees, in the very near future, the elimination of the paving burden. In fact, a suitable contract, superseding a most unfavorable one, has already been made with one of the largest towns in the district.

In view of the possibility of being totally relieved of this burden a program for the rehabilitation of equipment and track has been devised. The purchase of six new cars leads the list. This will be followed with the rebuilding of several miles of track, replacing portions which were not kept up in the years past when dollars were scarce and revenues unequal to the equipment, labor and paving charges.

The change of public sentiment is perhaps best indicated by the fact that the company now has 15 miles of track on paved streets on which it has been relieved of all paving requirements.

In Ambridge, a town of 17,000 population, the street over which the lines are operated was improved. At the same time the company laid new track. This was under a franchise requiring that the town pay the cost of the paving and maintain it. The company is then to pay, if earned, a rental of $1,200 a year, after operating expenses, taxes and interest on bonded indebtedness have been deducted from revenues.

Approximately $300,000 is to be spent on the improvements to be made.

## News Notes

**Brooklyn "L" Removal Bill Signed.**—Governor Smith of New York has signed the Hearn bill as chapter 374 of the laws of 1927 authorizing the city of New York to acquire by condemnation the right to remove the elevated railroad structure from Fulton Street and other streets and avenues in the Borough of Brooklyn and to assess the cost and expense thereof upon property benefited thereby.

**Will Make Survey of Other Lines.**—An inspection tour of electric railways in the principal cities of the country is being made by eight men experienced in railway operation under the direction of J. M. Loftis, superintendent of transportation, and A. J. Fink, superintendent of traffic and schedules of the Pittsburgh Railways, Pittsburgh, Pa. By this study of other systems the Pittsburgh Railways expects to discover improvements and advances in transportation that can be adjusted to its own lines.

**Transportation Plan Under Consideration.**—Mayor Frank X. Schwab of Buffalo has asked members of the City Council to consider plans for a transportation policy in anticipation of the opening of the new Peace bridge, which spans the Niagara River between Buffalo and Fort Erie, Canada. The Mayor recommended a municipal bus line from the retail shopping zone of the city to the American approach of the new bridge, to be opened early this summer.

**Rate-Fixing Bill Killed.**—The Minnesota Legislature in St. Paul has killed in committee of general legislation a bill to fix 6 per cent as legal rate of earnings for electric railways. The rate fixed by the Railroad and Warehouse Commission is 7½ per cent. The bill was sponsored by Representative Frank Starkey, St. Paul, and was designed to amend the Brooks-Coleman act, which placed the rate fixing power with the commission.

**New Route Book in Los Angeles.**—A new booklet entitled "Seeing Los Angeles by Yellow Car and Bus" has been published by the Los Angeles Railway, Los Angeles, Cal. This booklet contains information on places of interest in Los Angeles and how to reach them by street car or bus. It also contains schedules of owl car service on the various lines. Copies of these booklets are being distributed among the divisions for the use of conductors.

**Would Increase Token Rate.** — The Illinois Power & Light Corporation has applied to the Illinois Commerce Commission for authority to change its fares in Peoria, Ill., from seven tokens for 50 cents to three tokens for 25 cents, with a continuation of the present 10-cent cash fare. The nickel permit fare will be dropped under the new schedule. The company says that since the present schedule, put in force in 1922, it has failed by $200,000 annually to meet a fair return on its investment.

**Intercompany Transfers Issued.** — Issue of 1-cent transfers between cars of the Capital Traction and the Washington Railway & Electric Companies at New Jersey and New York Avenue in Washington, D. C., was authorized on April 7 by the Public Utilities Commission. The intercompany transfers will be issued, however, only by northbound cars on New Jersey Avenue to eastbound cars on New York Avenue and by westbound cars on New York Avenue to southbound cars on New Jersey Avenue.

**One Mayor Expresses Views on Paving Ruling.**—At a meeting of city officials of the state of New York to be held at Niagara Falls on May 31 legislation to relieve electric railways of any of their tax burdens will be discussed. The railways seek to amend the paving law to require them to pave only 8 in. on each side of a rail instead of paying for the pavement between the rails and 2 ft. outside. Mayor Clarence J. Cook of Binghamton, N. Y., is quoted as saying he believed that taxes paid by the electric railways were low enough and that the paving imposition might be considered as part of rental.

**Ten Cents in Port Chester.**—The fare on the new bus line of the County Transportation Company, Inc., within the village of Port Chester, N. Y., is 10 cents. Books containing twenty tickets each will be sold for $1 to pupils under eighteen years of age attending public or private schools having similar grades. Free transfers are given between the bus lines as well as to cars of the New York & Stamford Railway. The order became effective on April 3.

**Rebus Contest in Grand Rapids.**—Still further to stimulate riding and to familiarize the people with the names of its new electric rail coaches and other cars, the Grand Rapids Railway, Grand Rapids, Mich., has put on a rebus contest, with $100 in cash prizes, 25 special prizes—74 prizes in all. *Trolley Topics*, published monthly by the Grand Rapids Railway, explains the terms of the contest, which began on April 1 and ends on April 30. Of the 76 electric rail coaches and street cars with names in Grand Rapids, 27 are represented in the rebus sketches which the railway presents in the form of a contest open to everybody except employees. All are urged to familiarize themselves with the street car names, study the sketches and solve the puzzles. Answers will be judged by a committee and correct answers and names will be announced as soon as possible after April 30.

**Commission Without Right to Order Extension.**—The Fresno Traction Company, Fresno, Cal., has never dedicated its property to the service of the "Fink-Smith" district of that city. This was the ruling of the California Railroad Commission on April 5. The commission also held that it was without jurisdiction to direct the company to make the desired extension under the previous ruling of the California Supreme Court in the suit of the Hollywood Chamber of Commerce. This ruling compelled the commission to order a railway to construct an extension of its line. The city of Fresno filed a complaint with the Railroad Commission against the Fresno Traction Company and asked the commission to require that company to extend its tracks into the so-called "Fink-Smith" district.

**Traction Line Hauls Large Quantities of Coal.**—In spite of the strike of the union coal miners in the southern Indiana field, the Evansville & Ohio Valley Traction Company and the Evansville, Suburban & Newburgh Traction Company, the last named company operating from Evansville to Boonville and Evansville, are hauling a large amount of coal. The non-union coal mines in the southern Indiana fields are being operated steadily and as a result the electric railways are taxed to capacity to haul the coal into Evansville, from which city it is shipped to other markets. The wagon mines also are being operated and coal from many of these mines is hauled several miles in wagon to the nearest switch on the Evansville, Suburban & Newburgh line. It seems likely that most of the coal mines in the "pocket" will be operated to capacity all summer.

# Recent Bus Developments

## Bus Law in Lansing Upheld

The city ordinance of Lansing, Mich., prescribing routes for interurban and suburban buses was upheld by the State Supreme Court on April 1 in deciding the case carried up by the Highway Motor Bus Company and other bus lines operating in the city of Lansing. The bus companies sought to restrain the city from enforcing the ordinance. They brought action against the city in the Ingham County Circuit Court, claiming the city had no right to force the buses to operate on certain streets in Lansing.

Judge Leland W. Carr of the Circuit Court upheld the ordinance and after an appeal of the plaintiffs the Supreme Court affirmed the decree of the Circuit Court.

## Taxicab Operation in Cincinnati Under Control

The City Council of Cincinnati, Ohio, passed an emergency ordinance on March 16 requiring taxicab owners to carry insurance against personal and property damage. The policies for personal injuries to passengers must provide a $5,000 liability for a single personal injury and $10,000 for two or more persons for any one licensed vehicle. Damage to property must be covered by $1,000 insurance for one cab.

In the case of property damage the insurer has the option of limiting his total liability as follows:

| | |
|---|---|
| For not more than two public vehicles | $2,000 |
| For each vehicle in excess of two, not in excess of five | 1,000 |
| For each vehicle in excess of five, not in excess of ten | 750 |
| For each vehicle in excess of ten, not in excess of 25 | 500 |
| For each vehicle in excess of 25, not in excess of 50 | 300 |
| For each vehicle in excess of 50 | 200 |

## Tax Subject Under Discussion in St. Louis

The St. Louis Bus Company, the bus auxiliary of the United Railways, St. Louis, Mo., paid taxes the past year of $155,306, or almost double that of the preceding year. The competing bus company, the People's Motorbus Company, for the last year paid the city $63,803 in a special tax on the basis of 3 per cent of gross receipts. In the previous year this tax totaled $66,909.

The legislative committee of the St. Louis Board of Aldermen on April 6 voted to shelve the bill to raise the special tax on bus companies from 3 per cent to 5 per cent of their gross receipts. Mayor Miller and Director of Streets and Sewers Brooks and Street Commissioner Joseph Slater had advocated the passage of the bill.

Mayor Miller, comparing the taxes paid by the People's Motorbus Company with those of the United Railways, contended that the 5 per cent tax bill would tend to equalize the taxation of these public utilities. Richard W. Meade, president and general manager of the People's Motorbus Company, answering Mayor Miller's contentions, presented to the aldermanic committee a memorandum on the comparative tax assessments of the United Railways and the People's Motorbus Company.

## New York Board Still Marks Time on Bus Proposals

No solution of New York City's bus problem was reached on April 8 at a hearing before the Board of Estimate. Mayor Walker did announce his intention of moving for a vote on the award of bus franchises at the next meeting of the board on April 21. There was no indication, however, that he would be able to get the twelve votes in the board necessary to award the franchise for Manhattan, Brooklyn and Queens to the Equitable Coach Company, which he favors, or that the board would vote to award the franchises for the Bronx and Richmond.

## Substitution an Issue in Tarrytown

No action was taken at the meeting at Tarrytown, N. Y., on April 11 on the matter of local transportation there. It was a joint conference between the boards of Tarrytown and Elmsford and the town of Greenbush, comprising the whole township, and among those who attended were Judges Duell, McDowell and Seely. President S. W. Huff of the Third Avenue Railway and counsel for that company explained the position of the railway in the matter. Railway officials favor the continuation of that service, but the cost to the company of improving the roadbed under the repaving program proposed by public officials would be more than $300,000. This is an expenditure the railway considers prohibitive. The present fare by trolley is 5 cents in the zone from White Plains to Elmsford and 5 cents from Elmsford to Tarrytown. The fare suggested by bus is 10 cents from White Plains to Elmsford and 15 cents from Elmsford to Tarrytown. The next meeting to consider the matter is subject to call by Supervisor Williard.

## Indiana Service Seeks to Abandon Unprofitable Bus Lines

Authority to discontinue approximately 135 miles of intercity bus lines in northeastern Indiana is asked in a petition filed with the Indiana Public Service Commission by the Indiana Service Corporation, Fort Wayne. The lines over which the company proposes to abandon service are between Fort Wayne and Marion, 57 miles; Fort Wayne and Angola, 46 miles; Angola and Crooked Lake, 10 miles, and Angola and Coldwater, Mich., 22 miles. Interurban electric railway lines are operated by the same company between Fort Wayne and Marion and between Fort Wayne and Waterloo, near Angola.

In a statement accompanying the petition, Robert M. Feustel, president, said that the thirteen months ended Jan. 31, 1927, had shown a net operating loss of $19,411 on the Fort Wayne-Marion line. Income, he said, was $8,083, as against operating expenses totaling $27,494.

**Blue Goose Fare Increased.**—Fare on the Blue Goose Bus Line, operated between St. Louis, Mo., and Alton, Ill., by the Alton Railway, affiliated with the East St. Louis & Suburban Railway, has been increased from 65 cents to 90 cents for one way. The new rate became effective on April 10. The interurban fare on the cars of the St. Louis & Alton Railway will continue at 85 cents for one way or $1.50 for the round trip.

**Bus Patronage Disappointing.**—The Connecticut Company, which recently opened a new bus line between Newington Junction and Hartford, Conn., via West Hartford, has not carried the expected patronage. The Board of Selectmen of Newington is to take steps to advertise the advantages of the service offered by the railway. Schedules are to be printed and personal letters sent to the people, especially those who petitioned for the route.

**Bus Service Starts.**—The Washington, Baltimore & Annapolis Electric Railroad installed on April 1 a new, comfortable and de luxe coach service between Washington and Annapolis over the new National Defense Highway. Coaches leave Washington daily, including Sundays, at 9:30 a.m., 1:30 p.m. and 5:30 p.m. and leave Annapolis, including Sundays, at 8:30 a.m., 1 p.m. and 5 p.m. The one-way fare is $1.22 and the round-trip fare $2.32. Children under twelve years of age are carried at approximately half fare. Buses also serve intermediate points en route at proportionate fares. In Washington buses stop at all of the principal downtown hotels. This is in addition to the electric railway service that has been operated for years by the Naval Academy Junction Line.

**Bus Service Replaces Railway.**—The Northampton Street Railway discontinued its railway service between Northampton and Hatfield, Mass., at the close of business on April 13 and started bus operation in its place. This was the last link in the route from Northampton to Greenfield, formerly operated by the Connecticut Valley Street Railway. Tracks above North Hatfield are already removed and those from North Hatfield south to Northampton will be removed soon.

**New Bus Project Made Known.**—Plans have been announced by Mayor Frank X. Schwab of Buffalo, N. Y., for the establishment of another municipal bus line, although all previous attempts to operate municipal buses in Buffalo have resulted in failures. The latest idea of the chief official is to operate municipal buses in Kensington Avenue from Bailey Avenue to the easterly city line at a 5-cent fare with a 3-cent half-fare charge. The International Bus

Corporation, a subsidiary of the International Railway, and the Buffalo Motor Coach Company, Inc., have applications pending for the operation of buses in this section of the city where there are now no transportation facilities.

**Eight Cents on Bus Line.**—An 8-cent fare has been established between any two points in the city of Hudson, N. Y., on the bus line of the Eastern New York Transportation Corporation. Tokens, each good for a continuous trip between any two points, will be sold 17 for $1, but will not entitle the passenger to transfer to interurban cars of the Eastern New York Utilities Corporation, the parent company. Transfers to the interurban cars of the latter company will upon request be issued by operators of buses which connect with the cars and which buses are so marked. Valid single trip and commutation tickets, good on Eastern New York Utilities cars, will be accepted as part of a continuous trip. Tokens will not entitle passengers to transfers.

**Double-deckers on Pleasant Sundays.**—All single-deck coaches heretofore operated on the Morningside and Highland-Virginia Avenue lines of the Georgia Power Company, Atlanta, Ga., are to be replaced by double-deck coaches on all pleasant Sundays during the summer months. The schedules on Sundays are to be the same as the daily schedules. Both lines are operated through some of the most beautiful residential sections of the city.

**Working Out Bus Schedule.** — The Northland Transportation Company, Minneapolis, Minn., has bought the Mesaba Railway Coach Company, which serves communities between Aurora and Hibbing and has local runs in Virginia and Eveleth. The transaction is subject to the approval of the State Railroad and Warehouse Commission. The acquisition of this property gives the Northland company virtual monopoly of the transportation business on the range. The company already has a bus line running from Duluth north through Virginia and it is understood that buses on the line running east and west through Virginia will be scheduled to connect with buses on the north and south line out of Duluth. Abandonment of the electric line has been ordered by the federal court.

**Railway Supplies Service; Bus Petition Denied.**—The Public Service Commission has denied the petition of William A. Stone, doing business as the Silver Lake Park and White Plains Bus Line, for permission to operate a bus line in White Plains, N. Y. When this petition was filed the Silver Lake railway line was not in operation, as the receiver of the Westchester Street Railroad had discontinued service. The proposed bus line was intended to serve substantially the same section of White Plains as this branch of the railway. Subsequently, the Westchester Street Transportation Company, Inc., which succeeded the electric railway and is owned by it, resumed service and also obtained the consent of the city and the Public Service Commission to substitute buses for street cars. It was the opinion of the commission that the operation of a bus route in addition to the railway was not necessary.

# Financial and Corporate

## $58,157,236 Value at St. Louis

### State Commission Allows $6,395,888 for Additions Made to United Railways Property Since Year 1919

The United Railways, St. Louis, Mo., earned a return of only 4.2 per cent on its properties during 1926, a report of auditors for the Missouri Public Service Commission filed at Jefferson City on April 2 shows.

The audit sustains the contention of Receiver Rolla Wells that the company operated at a loss during 1925 and 1926 after paying interest on bonded indebtedness. The net loss for 1925 was $172,247 and for the first ten months of 1926 the deficit was $52,730, the report shows.

As a result of the audit the new valuation of the railway's properties for rate-making purposes is $58,157,236, including $6,395,888 in additions since 1919, when the valuation was found to be $51,761,348.

The auditors found the amount available for return in the first ten months of 1926 was only $2,039,886 and on that basis estimated the total for the entire year at $2,447,864. This is only 4.2 per cent of the $58,157,236 valuation.

The audit was made to determine the net amount of expenditure for additions and betterments between Jan. 1, 1919, and Oct. 31, 1926, and to determine results of operations in 1926 up to Oct. 31.

The auditors were J. J. Murphy, chief accountant for the commission; H. W. Ross, accountant in charge, and George B. Coleman, A. L. Houlehan and H. B. Lysaght. The investigation revealed:

Average requirements for working capital, $2,109,105.

Gross operating revenues for 1925, $18,913,332; operating expenses, taxes, depreciation, $16,445,402; net, $2,467,929.

After adding non-operating income and deducting interest, discounts and miscellaneous the deficit for 1925 was $172,247.

For first ten months 1926 operating revenues were $15,671,311 and operating expenses, taxes and depreciation $13,631,424, leaving a net revenue of $2,039,886. After adding non-operating income and deducting interest, discounts and miscellaneous items the deficit for the ten months was $52,730.

The estimated amount available for return in 1926, based upon first ten months, was $2,477,864, compared with $2,467,929 in 1925.

The audit revealed the payments for personal injuries and property damage claims in the period April 12, 1919, to Oct. 31, 1926, were $8,000,000.

The credit balance in the depreciation reserve as of Oct. 31, 1926, was increased by almost $900,000 by the auditors in their adjustments, which showed credits of $1,004,356 and debits of $114,931.

The total estimated liability of the company for personal injuries and damage claims as of Oct. 31, 1926, was $1,549,840, while the balance in the reserve on that date was $645,629, a deficit of $904,210. The company has based its credits to this reserve at 6 per cent of gross receipts.

In their report the auditors expressed the opinion that a fixed percentage of gross revenues does not appear to be the best method for measuring the cost of injuries and damage claims since fares and gross revenues may go up or down without affecting traffic accidents. The report stated that "in our opinion 'cost per car-mile' is a more scientific method for measuring injuries and damages."

Receiver Wells filed his first petition for a higher fare some months ago. The city then demanded an audit of the company's books to determine whether an increase was warranted. From Feb. 5 to March 1 under a federal court injunction the company charged a fare of 8 cents, with two tokens for 15 cents, but this rate was later set aside by a special federal court of three judges.

The company now has an application for increased fares pending before the commission. A fare of 8 cents, with two tokens for 15 cents, has been asked. In view of the findings of the auditors for the commission it is very probable the company will be granted the increase.

The bringing of the company's valuation up to date is expected to speed up the negotiations between Mayor Miller and the reorganization committee on a new franchise for the railway under the service-at-cost plan.

## $1,885,000 Boston "L" Issue Offered

A syndicate composed of Paine, Webber & Company, White, Weld & Company, Stone & Webster & Blodget, Inc., of New York, and the First National Corporation, Boston, offered for subscription on April 14 $1,885,000 of ten-year 5 per cent gold bonds of the Boston Elevated Railway, Boston, Mass. They were priced at 100¾ and interest to yield 4.90 per cent. The bankers stressed the point that the net earnings are about 2¼ times the rentals and interest charges.

## $7,000,000 Cincinnati Street Railway Issue

A syndicate headed by the Guaranty Company, New York, and W. E. Hutton & Company offered publicly on April 11 $7,000,000 of first mortgage series A 5½ per cent gold bonds of the Cincinnati Street Railway, Cincinnati, Ohio, to mature April 15, 1952, at 100 and accured interest, to yield 5½ per cent. The issue has been authorized by the Director of Public Utilities of the city of Cincinnati and the Public Utilities Commission of Ohio, and the proceeds will be used to retire outstand-

ing $4,500,000 of 6 per cent notes, to reimburse the company for capital additions heretofore made and to provide funds for further additions and other corporate purposes.

The bonds will be a direct first lien on all fixed property and all equipment now owned by the company, except a part of the company's railway cars on which there is a prior lien represented by $711,400 outstanding equipment trust certificates.

### Changes in Foshay Company Corporate Structure

Although the W. B. Foshay Company, Minneapolis, Minn., has sold its controlling interest in the Peoples Light & Power Corporation, its utility business will continue as in the past. The Foshay company now operates electric, gas and artificial ice properties in Nogales, Ariz., and Nogales, Mexico. valued at $1,600,000. It has under contract electric and gas properties which are in operation in Vermont, Kansas and Idaho.

The name of the W. B. Foshay Company's new public utility holding company will be Public Utilities Consolidated Corporation. This corporation will operate the Arizona company, which will be called Public Utilities Arizona Corporation. When public utility properties which are under contract in other states are taken into the holding company, they will be known as Public Utilities Vermont Corporation, Public Utilities Kansas Corporation and Public Utilities Idaho Corporation.

# Readjustment in Grand Rapids

## Voluntary Recasting of Financial Structure of Grand Rapids Railway Proposed—Financing Can Be Done Now Only Through First Mortgage Bonds—The Details

A PLAN of readjustment has been suggested for the Grand Rapids Railway, Grand Rapids, Mich., which contemplates the organization of a new company to take over the assets of the present company and the cancellation of all of its common stock, and extinguishment of $600,000 of its indebtedness through the issue of common stock of the new company, and the exchange of preferred stock on the basis of two shares of new company common stock for one share of present preferred stock, the depositors of which are also offered subscription rights. The plan also provides for the authorization of additional preferred stock by the new company to provide funds further to reduce existing indebtedness and for other corporate purposes.

It is explained that the changes suggested are deemed advisable at this time because of the large floating indebtedness of the old company and its lack of a medium for doing any financing other than through first mortgage bonds which cannot be issued and sold in sufficient amount or at advantageous prices in view of the company's present condition. The present floating debt position dates back to June 1, 1919, when three-year bonds amounting to $3,700,000 became due, which bonds were in turn issued to refund the long term 5 per cent bonds originally issued in 1900. The capital expenditure situation since June 1, 1919, is shown in the accompanying table.

CAPITAL EXPENDITURE SITUATION OF GRAND RAPIDS RAILWAY

| | | |
|---|---|---|
| Payments: | | |
| Bonds maturing June 1, 1919.. | | $3,700,000 |
| Construction from June 1, 1919, to Dec. 31, 1926 ..... | | 1,411,892 |
| Reacquirement of $229,000 first mortgage bonds of present issue through sinking fund, etc. | | 206,000 |
| Total payments for capital purposes ..... | | $5,317,892 |
| Receipts: | | |
| $3,200,000 first mortgage bonds sold.... | $2,944,000 | |
| Insurance moneys received on account of Hall Street carhouse property and cars destroyed by fire ..... | 368,395 | |
| Provided out of earnings and reserves.. | 559,298 | 3,871,693 |
| Leaving net increase in debt junior to first mortgage bonds amounting to ..... | | $1,446,199 |
| Now represented by: | | |
| Gold debenture 7 per cent ..... | $700,000 | |
| Car trust notes .... | 198,045 | |
| Increased amount of paving assessments not due ..... | 69,977 | |
| Increased amount of accounts payable .. | 58,218 | |
| Advances payable .. | 245,458 | |
| Bank loans ..... | 174,500 | |

The present outstanding first mortgage bonds require sinking fund payments of $80,000 annually and the car car trust notes become due about $8,000 a month or approximately $98,000 a year until their final maturity May 26, 1929. Thus these two items alone constitute a cash requirement of about $178,000 a year. It is believed the consummation of the plan will enable the company again to sell its first mortgage bonds at prices more nearly approaching par, and an agreement has been reached for the sale of $200,000 of first mortgage bonds upon the plan being declared operative, the proceeds to be applied to the retirement of all the car trust notes, thus ending the monthly drain on the cash resources on their account, which with saving of interest on the $600,000 debt canceled will reduce the annual cash outlay by about $140,000. The proceeds from the new preferred stock will be applied first to the liquidation of bank loans and thereafter to the liquidation of other indebtedness and thereby improve the current asset position and thus to that extent free the cash derived from earnings and make it available for payment of dividends, first on the new preferred stock and then on the new common stock.

The 100,000 shares of new common stock are to be issued in consideration of the extinguishment of $600,000 of present outstanding debt of the Grand Rapids Railway (i.e. cancellation of $245,000 advances payable and $355,000 gold debenture 7 per cent bonds), the cancellation of $2,000,000 par value of old common stock and the making to the holders of the old preferred stock of the exchange and subscription offers outlined in the plan. Assuming that all the holders of old preferred stock exchange and subscribe to the full amount of new preferred stock offered under the plan, there would result:

| | |
|---|---|
| 100,000 | shares new common stock issued |
| 40,000 | shares new common stock to holders of 20,000 shares old preferred stock |
| 60,000 | shares new common stock representing consideration for extinguishment of $600,000 of debt |
| 15,000 | shares new common stock of which will be delivered if entire $300,000 new preferred stock offered under the plan is subscribed |
| 45,000 | shares remaining in hands of holders who cancelled the $600,000 of debt |
| 15,000 | shares of which will be reserved for delivery upon payment to them of $10 per share upon exercise of options expiring May 1, 1929, delivered to subscribers under the plan. |

The earnings position of the new company, based upon all matters outlined in the plan as applied to the actual earnings for twelve months ended Feb. 28, 1927, will be:

| | | |
|---|---|---|
| Gross earnings ..... | | $1,774,748 |
| Operating expenses and taxes: | | |
| Operating expenses ..... | | 1,091,267 |
| Taxes ..... | | 153,671 |
| Total ..... | | $1,244,939 |
| Gross income available for fixed charges, retirements and dividends ..... | $ | 529,809 |
| Annual interest at 7 per cent on $3,171,000 mortgage bonds... | | 221,970 |
| Interest on $219,500 debentures | | 15,365 |
| Interest on unpaid paving assessments ..... | | 5,052 |
| Total interest and other fixed charges ..... | $ | 242,387 |
| Balance ..... | $ | 287,421 |
| 7 per cent on $300,000 preferred stock ..... | | 21,000 |
| Balance available for retirements and other purposes..... | $ | 266,421 |

In September, 1922, an ordinance ratified by the voters granted the Grand Rapids Railway a 30-year franchise and provided a sliding scale of fares based on net return upon valuations agreed upon in the franchise. This franchise will be assumed by the new company. The original value placed upon the property was $5,500,000 as of Jan. 1, 1922, which with subsequent additions to Feb. 28, 1927, amounts to $6,043,234. The rates of fare now in effect, viz., 10 cents cash and six tickets for 50 cents, were instituted at the beginning of 1925, at which rates the property is entitled, according to the franchise terms, to earn a return of 7¾ per cent on its value after deduction of operating expenses and taxes, and an amount equal to 3 per cent of the value of the property for retirement reserve. As of Feb. 28, 1927, the deficit in the automatic fare equalization account was $423,173; in other words, that is the amount that the property failed

to earn the return allowed under the franchise from its date to Feb. 28, 1927. It is estimated that if the full return allowed by the franchise is realized the earnings would be increased $98,912.

Deducting from $266,421 the balance of earnings previously indicated, 3 per cent of the present value of the property for retirement reserve, or $181,297 there would remain available $85,124, or 85 cents a share on the 100,000 shares of the new company common stock to be issued and outstanding. If the charge for retirement reserve were modified to 2 per cent or $120,864, an amount the management believes adequate in view of the present excellent condition of the property, the sum of $145,557 would be available for the 100,000 shares of common stock of the new company, to be issued and outstanding. This would mean a return on the stock at the rate of $1.45 per share.

## Deal on for Newport Electric Corporation

Offer of $150 a share on option has been made for control of the Newport Gas Light Company by the Utilities Power & Light Corporation of Chicago. The Colonial Gas & Electric Light Company, which controls Newport Electric Corporation, is a subsidiary of Utilities Power & Light. No action either toward recommending or advising against sale has yet been taken by the directors. The Newport Electric Corporation operates 22 miles of electric railway and city and interurban bus service in which nineteen buses are used.

## $159,000,000 in Boston "L" Against $25,000,000 in 1897

A chart prepared by the Boston Elevated Railway, Boston, Mass., shows some of the important facts regarding the Boston Elevated Railway in terms of increase from 1897.

At present the investment of about $159,000,000 in the property is roughly 530 per cent greater than that of 1897, which was somewhat more than $25,000,000. The investment has on the whole increased steadily, with a rapid increase in 1917-1918, and very slight increases in some years, such as 1912-1913, 1919-1921 and 1924-25. The average annual investment has been about $4,500,000.

Revenue passengers carried have about doubled, but since 1914 the annual total has remained fairly constant. Riding, however, has increased faster than the population.

The population is now a little more than 50 per cent greater than in 1897, and is still rising, although somewhat slowly at the present time.

The relation of riding and population is reflected in the revenue rides per capita, which in 1917 were 50 per cent greater than in 1897. The increase in fare which the trustees found necessary as soon as they took hold of the property resulted in some falling off. This loss has since been recovered in part. While the total of revenue passengers is about as great now as ever, the population increase lowers the ratio.

## Eastern Massachusetts Does Well

### Intensive Merchandising of Service Helps Road Operating in Suburban Boston Territory

The Eastern Massachusetts Street Railway, Boston, Mass., reports for 1926 an increase of $149,855 over 1925 in revenue from all sources, but the cost of operation before taxes, interest and rental charges was $182,484 greater than the previous year. In 1926 the company failed to earn operating expenses and depreciation (not including taxes and interest) by $62,207, compared with a loss of $82,823 in 1925.

Revenue from all sources in 1926 was $9,788,035, an increase over 1925 of $149,855. Expenses including depreciation, taxes, etc., in 1926, were $7,807,332, an increase over 1925 of $199,295. Gross income in 1926 was $1,980,703, a decrease from 1925 of $49,440. Interest and rentals, etc., in 1926 were $1,245,865, a decrease from 1925 of $45,955. Net income available for dividends in 1926 was $734,838, a decrease from 1925 of $3,485.

Dividend payments of $866,522 were made in 1926 as follows:

| | |
|---|---|
| First preferred | $249,165 |
| Sinking fund | 1,929 |
| Preferred B | 179,868 |
| Adjustment | 435,560 |
| Common | none |

On the first preferred and sinking fund stocks payments of 3 per cent were made on Feb. 15 and Aug. 15. On preferred B, payments of 3 per cent were made on Feb. 1 and Aug. 1. On adjustment stock, payments of 2½ per cent were made on April 1 and Oct. 1.

Bonded obligations were retired and paid at maturity as follows: $131,000 Bay State equipment 6's due Aug. 1, 1926; $300,000 Eastern Mass. series A 6's, due Jan. 1, 1927; $115,000 Eastern Mass. series C 6's, due Feb. 1, 1926; $2,500 par sinking fund stock, series 7, due Feb. 1, 1926, paid and canceled.

The largest factor in the increased expenses was the additional burden imposed by a board of arbitration which not only granted the blue uniform, line, power and rolling stock and miscellaneous employees on increase of 1½ cents an hour but also established an eight-hour day and time and one-half for all overtime.

As compared with 1924 and 1925, when there were decreases of $993,343 and $449,395 respectively, an increase in 1926 of $136,501 in revenues is encouraging. This increase is attributed in a considerable measure to an advance in ticket fares which took effect on Oct. 1, and to weather conditions in November and December, the early snows and low temperature causing private automobile owners to store their machines and ride in street cars.

The percentage increase in riding for these two months was substantially the same throughout the system. Total passenger car miles operated in 1926 were 17,731,483.

Realizing that the principles of merchandising must be applied to the railway as in every other business, the company has pursued the policy of improving its cars by large expenditures for painting, various up-to-date devices and the installation of de luxe seating and lighting facilities and linoleum flooring. This program will be consistently followed. In this connection the company now operates between Brockton and Mattapan, Lowell and Everett terminal and Lawrence and Everett terminal high-speed cars of the very latest type at popular reduced rates of fare. Increased earnings are reported on all three of these de luxe lines.

In addition the company has recently purchased 50 new light-weight, high-speed cars embodying the new ideas of comfort and convenience. These are to take the place of cars worn out in the service. Delivery is expected during May and June. The new cars will be paid for from the depreciation reserve accumulated for that purpose.

As might be expected, in view of the arbitration award, the cost of car operation was $162,380 more than in 1925, overshadowing all other items of increased expense. Wage comparisons for 1926 and 1925 follow:

| | 1926 | 1925 |
|---|---|---|
| Wages two-man car operators | $158,683 | $154,241 |
| Wages one-man car operators | 1,527,011 | 1,468,430 |
| Wages carhouse employees | 177,466 | 165,183 |

The cost of snow fighting in 1926 was $141,845, compared with $54,693 in 1925. Approximately 70 per cent of this was paid in wages.

Other increases in expenses were:

| | |
|---|---|
| Way and structures | $8,273 |
| Law expenses | 13,429 |
| Rent of track | 7,355 |
| General wages and expenses | 12,591 |
| Pensions | 2,215 |
| Stationery and printing | 1,717 |
| Miscellaneous expenses | 23,857 |

The claim department made a very creditable showing, the total expenditures for the year being $262,165, the smallest yearly amount since public control began and less by $32,495 than the previous year. Other decreased expenditures were for: equipment, $24,-

INCOME STATEMENT OF EASTERN MASSACHUSETTS STREET RAILWAY

| | 1926 | 1925 |
|---|---|---|
| Street car revenue | $8,699,914 | $8,563,413 |
| Auto bus revenue | 321,317 | 278,758 |
| Express and other revenue | 41,879 | 42,757 |
| Rentals, advertising, etc. | 198,051 | 205,713 |
| From sale of power | 272,527 | †313,248 |
| Interest and other income | 254,347 | 234,291 |
| Total revenue | $9,788,035 | $9,638,180 |
| Expenses: | | |
| Way and structures | $1,229,616 | $1,221,343 |
| Equipment | 1,230,046 | 1,254,192 |
| Power | 1,281,790 | †1,277,787 |
| Car operation | 2,378,475 | 2,216,099 |
| Injuries and damages | 262,166 | 294,661 |
| Insurance | 73,810 | 84,895 |
| Law expenses | 40,255 | 26,826 |
| Rent of tracks | 80,167 | 72,812 |
| General wages and expenses | 235,724 | 223,133 |
| Pensions | 23,045 | 20,830 |
| Group insurance | 64,866 | 64,402 |
| Stationery and printing | 37,201 | 35,484 |
| Stores and garage expenses | 53,299 | 61,316 |
| Miscellaneous expenses | 68,210 | 44,353 |
| Auto bus expenses | 383,524 | 361,581 |
| Total operating expenses | $7,442,194 | $7,259,710 |
| Total operating expenses and taxes | $7,807,332 | $7,608,037 |
| Gross income | 1,980,703 | 2,030,143 |
| Interest and rentals | 1,245,865 | 1,291,820 |
| Net income | $734,838 | $738,323 |

Operating expenses include charges for depreciation amounting to $917,940 in 1926 and $898,254 in 1925. During 1926 $745,578 of the depreciation reserve was applied to reconstruction and amortization.

† Of the amount $313,248 in 1925—$304,930 was included in report for 1925 as a reduction to power expense; the difference, or $8,318 included with "rentals, advertising, etc."

146; insurance, $11,085; stores and garage expenses, $8,017.

The attitude of the trustees on the matter of bus operation is that where the company has rails and overhead construction in good condition and there is sufficient volume of business to warrant the continuance of electric cars, it would be unjust, not only to the owners of the property but to the riding public, to supplant street cars with buses. In densely populated areas the addition of a multiplicity of buses would throw an unwarranted burden upon communities whose principal highways are already overloaded with motor traffic. On the other hand, there are some small communities in which there are no peak loads and where the bus can be used to advantage and principally in the handling of this type of business the company operated in 1926 1,287,167 bus-miles, this being 207,451 more miles than in 1925. Wherever, in the territory served by the railway, the trustees know that there is only enough "pole to pole" transportation business for one responsible carrier, and there is a threat of bus competition they do not intend to be coerced or driven to establishing a duplicate and wasteful service. On this point the trustees say:

> Our duty to the car riders and the owners of this road is clear and we propose to perform it. Among those who would be first to condemn us if the fallacious reasoning of the advocates of paralleling street car lines with bus line were adopted and the inevitable higher fares and deteriorating service followed, would be these same, perhaps well-intentioned but misinformed, partisans of such an experiment.
>
> Wherever public convenience and necessity require service, this company, with permission from the proper authorities, will perform it, either with street cars or buses.

All of the bus lines operated in 1925 were continued in 1926. In addition bus operation was substituted for railway service between Rockland and Braintree and between Weymouth and Hingham, where the rails were worn out and rebuilding was out of the question because of its great cost and the comparatively small receipts of the route. Bus revenues for the entire system increased $42,559; expenses were $21,943 more than last year. The company now owns 65 buses and motor coaches, representing an investment of $458,608 and operates them in eighteen cities and towns.

It also runs an interstate route between Taunton and Providence, and during the summer months runs lines between Mattapan and Nantasket and Neponset and Nantasket. To aid in snow fighting on bus lines, seven caterpillar tractor snow plows were purchased during the year at a cost of $33,810. There are now 37 bus snow-fighting units on the system. During the summer months part of this equipment is available in connection with track and other types of construction.

Reference was made in the last annual report of the public trustees to the bill in equity brought by L. Sherman Adams, a stockholder, seeking to compel the public trustees to pay dividends claimed to have accrued on the common and adjustment shares of the company to Feb. 1, 1924. As stated in the last annual report, the master appointed by the Supreme Court to hear the evidence and find the facts filed his report on Jan. 29, 1926, after long hearings. The case was reserved upon the pleadings, the master's report and the exceptions of both parties for the consideration of the full bench of the Supreme Judicial Court. The case was argued March 18, 1926, and the opinion of the full bench of the Supreme Court was rendered on Oct. 2, 1926. In its opinion, the Supreme Court over-ruled the exceptions of the plaintiff and sustained thirteen out of fourteen exceptions of the defendants, and ordered a final decree to be entered dismissing the plaintiff's bill with costs.

The trustees point out that at no other period in the history of this company has the rolling stock throughout the system been in such good condition. They ascribe this as due to the systematic and intensive program of overhauling which was started several years ago. Every car in regular service has been through the repair shop, either at Chelsea or Brockton, painted inside and outside and thorough attention given to mechanical details. The results are apparent even to the casual observer. Twofold benefits are set down as having accrued from the establishment of this policy: the net cost of maintenance has been greatly reduced and the company also enjoys the advantage of doing business with well pleased customers.

In 1920, 14,336 crippled cars were taken out of service and pulled in the carhouses, this being at the rate of one defect for every 1,550 miles of operation. In 1926 only 685 crippled cars were pulled in, this being at the rate of one defect for very 27,110 miles of operation. In the Brockton-Mattapan, Lowell-Everett terminal, Lawrence-Everett terminal de luxe service, the rolling stock department outfitted nineteen cars at the cost of $1,500 a car.

## Conferences Look Toward Sale of Hocker Line

Negotiations are under way for the sale of the Kansas City, Lawrence & Topeka Electric Railroad, a 12-mile interurban, known as the Hocker line, to the Kansas City Public Service Company, Kansas City, Mo. The line has been in receivership for the past eight years. It operates between Kansas City and Zarah, Kans., passing through Merriam and Shawnee where the chief patronage lay.

As a basis for the negotiation, W. K. Paul, superintendent of the line for the receiver, is preparing a complete report of the physical assets to be presented to officials of the Kansas City Public Service Company. It is known that Fred G. Buffe, vice-president of the Kansas City Public Service Company, made a survey of the Hocker line a year ago, prior to the termination of the receivership of his company.

The Kansas City, Lawrence & Topeka Electric Railroad was organized in 1907 by the late R. W. Hocker. All the stock of the company is held by the Hocker estate and by F. P. Dickson, president of the company. The original plan was to extend the line through to Topeka and a start toward this end was made in 1916 when the line, which ended at Shawnee, was extended to Sarah, a distance of 6 miles. The coming of the World War halted development.

**Increase in Revenue in Boston.**—For the month of January, 1927, the revenue of the Boston Elevated Railway, Boston, Mass., exceeded cost of service by $186,947 compared with an excessive revenue of $223,301 in January, 1926. The revenue passengers numbered 34,160,787, against 33,144,528 for January, 1926. In January of the current year 5,004,125 miles were operated, against 4,871,361 in January of the year preceding.

**Jersey Issue Oversubscribed.** — The offer of 30,000 shares of 6 per cent cumulative preferred stock of the Public Service Corporation of New Jersey, Newark, N. J., to customers of its subsidiary companies on April 1 has been oversubscribed. Subscriptions for 33,561 shares had been received from 6,818 persons at close of business on April 6. The average number of shares per subscription was less than five. This issue, sold in five working days, is a new record for the company.

**Stock Issue for Improvements.**—The Cleveland Railway, Cleveland, Ohio, has been authorized by the Ohio Utilities Commission to issue $2,904,600 in capital stock at $100 a share plus accrued interest. The additional money is to be used for extensions and improvements including the buying of buses and cars.

**Investment Expert Discusses Chicago Issues.**—Wm. Hughes Clarke, Chicago, dealer in investments bonds and stocks, has issued a circular in which he has reviewed earnings and other data covering the combined Chicago Surface Lines and the separate companies. He is also the author of articles contributed to the Feb. 26 and March 5 issues of the *Financial World* containing summaries covering the Chicago traction situation interesting to all who are concerned with electric railway operations and investments.

**Oppose Abandonment.**—Protests are being filed with the Public Service Commission to enjoin the Portland Electric Power Company from discontinuing 12 miles of interurban line between Montavilla Depot, Portland, Ore., and the town of Troutdale, Multnomah County. The company is applying for authority to discontinue the branch of service on the grounds that the operation of motor trucks and private automobiles has become so great that the railway can no longer operate with profit.

**Authorized to Sell Land.**—The Pacific Electric Railway has been authorized by the California Railroad Commission to sell to the Pacific Electric Land Company for the sum of $126,000 a number of parcels of land along its Newport Beach line, partly in the city of Long Beach, and partly in the city of Seal Beach, Orange County.

**Union Street Railway Shows Deficit.**—For the calendar year 1926 the Union Street Railway, New Bedford, Mass., reported a deficit of $1,748, after deducting dividends, which were equivalent to 6 per cent on the company's capitalization of $2,437,500. For 30 years previous the annual dividend had been 8 per cent. The profit and loss surplus as of Dec. 31, 1926, was $619,927. This company is the last with a 5-cent fare unit in Massachusetts; the railway now proposes a 10-cent fare.

# Personal Items

## Personnel Changes in Richmond

The election of William E. Wood to the presidency of the Virginia Electric & Power Company, Richmond, Va., to succeed Luke C. Bradley resulted in numerous advancements.

J. Franklin McLaughlin will be in charge of operations of the company with offices at Richmond.

Thomas P. Walker, who has previously been in charge of properties under Stone & Webster management in El Paso, Tex., will succeed Mr. McLaughlin as vice-president in charge of the Norfolk Division. T. Norman Jones, Jr., will become general manager of the Norfolk division. J. B. Hayes, formerly assistant to the president, will become general superintendent of transportation of the Norfolk division, reporting to the general manager of the Norfolk division. R. C. Hopkins succeeds Mr. Hayes as assistant to the president and to the vice-president in charge of operations.

Other changes include the following: Louis F. Riegel, heretofore sales manager for Richmond, will become general sales manager for the system, reporting to the vice-president in charge of operations. W. E. McCreery, sales manager of the Norfolk division, will hereafter report to the general sales manager. C. S. Stackpole, formerly of the sales department of the Norfolk division, will succeed Mr. Riegel as sales manager of the Richmond division and will report to the general sales manager. O. W. Morton, formerly assistant to the vice-president of the Norfolk division, will become sales manager for Norfolk, reporting to the sales manager of the Norfolk division. E. H. Hill, formerly assistant superintendent of the electric department of the Norfolk division, will succeed Mr. Morton as assistant to the vice-president of the Norfolk division. E. F. Turner will become superintendent at Fredericksburg, succeeding Mr. Venable.

## W. L. Snodgrass Heads New Department in Fort Wayne

The Indiana Service Corporation, through Henry Bucher, manager of railways, recently announced that a separate department had been formed to handle all traffic matters. This new department was made necessary because the combined work of transportation and traffic matters, which has been handled by J. A. Greenland, had grown to a point where it was necessary to organize a new department.

The new department will be known as the traffic department. It will be under the direction of W. L. Snodgrass, with the title of superintendent of traffic. Mr. Snodgrass has had considerable experience in traffic matters and for some time past has been in charge of traffic solicitation for this company. Under the new arrangement he will move from LaFayette to Fort Wayne.

Mr. Greenland, superintendent of transportation, will continue to supervise all transportation matters.

## N. T. Brown a Vice-President in Buffalo

Nelson T. Brown has been elected vice-president in charge of transportation of the International Railway, Buffalo, it was announced by Bernard J. Yungbluth, president of the corporation. Mr. Brown comes to Buffalo from Philadelphia, where he has been in charge of the bus division of the Philadelphia Rapid Transit Company for the last five years. He has been associated with railway interests in Philadelphia for 25 years. Mr. Brown has already assumed his new position in Buffalo.

## F. M. Mills of Sioux Falls Honored

Frank M. Mills, president of the Sioux Falls Traction Company, Sioux Falls, S. D., celebrated his 96th birthday anniversary on April 4. He is said to be the oldest active electric railway executive in the United States. When a group of representatives of the Chamber of Commerce called to pay their respects and extend felicitations, he announced that he was confidently looking forward to his centennial year. Mr. Mills launched the Sioux Falls railway system more than twenty years ago. Much of the business is now handled by his son, Roger Mills, but the elder executive is daily at his desk.

## Changes in Jersey

At a meeting on April 13 of the directors of the Public Service Corporation, operating the Public Service Railway, Newark, N. J., a few changes were announced. They are as follows:

Edward A. Armstrong, assistant general counsel, was appointed general counsel.

William B. Hartshorne was made assistant to the president.

Harry P. Chandler, recently appointed executive assistant, was made chairman of the welfare committee.

## Arthur Bland Made Manager

Arthur Bland, who has been director of public relations for the Southern Ohio Public Service Company, with offices in Columbus, has been made manager of the company. He succeeds R. Z. Zimmermann, who is now associated with Day & Zimmermann, Philadelphia.

## George J. Carney Joins McGraw-Hill Staff

George J. Carney, who has been assistant to the director of the Wisconsin Public Utilities Bureau since 1920, became an assistant editor of the *Electrical World* on April 1. His headquarters will be in Chicago for the present, and his editorial duties will involve general editorial assistance to F. R. Innes, the Western editor of the *Electrical World*. For the past six years Mr. Carney has been engaged in utility information bureau work in Wisconsin and has served as correspondent for the ELECTRIC RAILWAY JOURNAL, *Electrical World* and other McGraw-Hill publications. He has a wide acquaintance with utility men and utility conditions in the Chicago territory.

Mr. Carney was born in Milwaukee in 1898 and after completing his education served in the World War and participated in all the major engagements of the American forces. Business experience with the Pathé Exchange, Inc., and general newspaper work preceded his connection with the Wisconsin Public Utility Bureau.

# Obituary

## Albert M. Lynn

Albert M. Lynn, president of the West Penn Electric Company and a director of the American Water Works & Electric Company, died in New York City at the Roosevelt Hospital on April 8. For more than 30 years Mr. Lynn had been identified in important executive capacities with the public utility properties of the American Water Works & Electric Company. Subsidiary companies include the Monongahela West Penn Public Service Company and West Penn Railways.

The late president of the West Penn property entered the employ of the American Water Works & Guarantee Company, the predecessor of the American Water Works & Electric Company, on Feb. 1, 1893, and served for some years in the general offices at Pittsburgh. He then became manager of the company's water works plant at Chattanooga, Tenn., and later of that at Birmingham, Ala. For many years thereafter he was in charge of a large proportion of the company's water works properties. In 1917 Mr. Lynn was elected president of the West Penn Company and upon the organization of the West Penn Electric Company he became its president, in which capacity he was serving at the time of his death.

Mr. Lynn was born in Indianapolis on Oct. 12, 1875, moving with his family to Pittsburgh in 1889, where he attended public schools.

**William T. Nary**, a superintendent of the Berkshire Street Railway, North Adams, Mass., since 1892 and one of the oldest electric railway operating officials, in point of service, in that section of the country, died in his home in Adams on April 10. He entered the employ of the Hoosac Valley Street Railway in the late '80s as a conductor on a horse car running between Adams and North Adams. The Hoosac Valley company was one of the first to electrify its lines and Mr. Nary was instrumental in making the change. As superintendent of construction Mr. Nary supervised the construction of the Williamstown-North Adams line of the Berkshire Street Railway. He was 63 years old.

# Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

## Committee Formed to Consider Cars for New York

A committee of engineers, to be headed by Col. William C. Lancaster, chief engineer of the New York Transit Commission, whose function it will be to ascertain whether a steel car of sufficiently light weight can be designed for operation on the elevated structure in New York City, was formed on April 3 at a conference held at the Transit Commission offices, attended by representatives of the Board of Transportation, the rapid transit railroads, various car construction companies, the Bethlehem Steel Company, the Westinghouse company and other organizations concerned with the subject. W. S. Menden and Frank Hedley, heads of the B.-M.T. and I.R.T. respectively, pledged their assistance in the Transit Commission's effort to ascertain whether such a car can be designed.

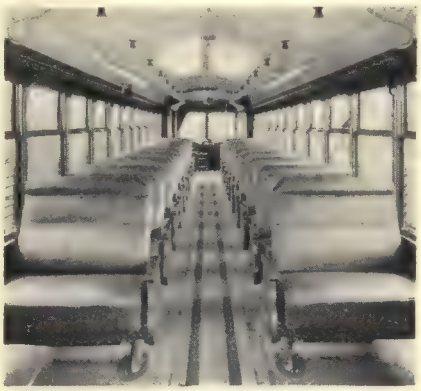
## A.C.F. Sells Wire Wheel Business

The Wire Wheel Corporation of America has purchased the wire wheel business of the American Car & Foundry Motors Company, a subsidiary of the American Car & Foundry Company. The acquired business is in Detroit, and under the plan of acquisition a considerable portion of the plant equipment is to be moved to Buffalo, where the Wire Wheel Corporation is located.

The current output of Wire Wheel, will be increased from 20 to 25 per cent by the acquisition of the new concern. No present expansion of the business of the Wire Wheel Corporation is expected, he said, but that action may be necessitated later on account of increased business.

## New Cars for Berkshire Railway Elicit Public's Praise

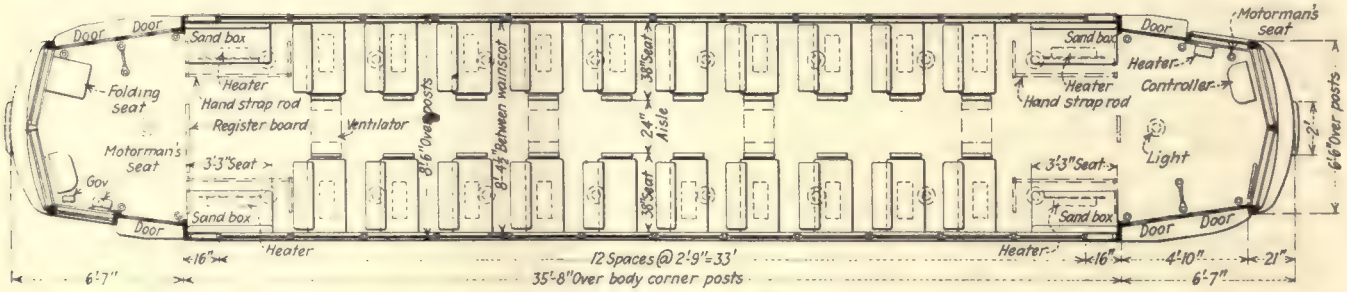
Citizens and the press of Pittsfield, Mass., have joined in praising the twelve new A.E.R.A. standard interurban double-truck safety cars recently delivered to the Berkshire Street Railway by the Osgood-Bradley Car Company, according to a recent statement from General Manager C. Q. Richmond. "We find," writes Mr. Richmond, "that the comments of the people riding and of the press have been entirely favorable and we are very sure that the placing of these cars on our lines has brought us increased business."



A glimpse of the riding comforts afforded by the twelve new Pittsfield cars, which were built by the Osgood-Bradley Car Company

Specifications for the cars, which were delivered late in November last year, are as follows:

| | |
|---|---|
| Weights: | |
| Car body equipped | 22,800 lb. |
| Trucks with motors | 14,400 lb. |
| Total | 37,200 lb. |
| Bolster centers, length | 24 ft. 11 in. |
| Length over all | 48 ft. 10 in. |
| Truck wheelbase | 5 ft. 6 in. |
| Width over all | 8 ft. 7⅝ in. |
| Height, rail to trolley base | 11 ft. 3 in. |
| Body | Semi-steel |
| Interior trim | Mahogany |
| Headlining | Agasote |
| Roof | Arch |
| Air brakes | General Electric |
| Armature bearings | Plain |
| Axles | A.E.R.A. standard E-2 |
| Bumpers | Anti-climber |
| Car signal system | Consolidated |
| Car trimmings | J. L. Howard & Co. |
| Center and side bearings | Osgood-Bradley |
| Compressors | General Electric CP-27B |
| Control | General Electric K-35-KK |
| Couplers | Osgood-Bradley |
| Curtain fixtures | Curtain Supply |
| Curtain material | Double-faced Pantasote |
| Destination signs | Hunter |
| Door-operating mechanism, | National Pneumatic |
| Energy-saving device | Arthur |
| Fenders | Massachusetts standard |
| Finish | Enamel and varnish |
| Gears and pinions | General Electric |
| Hand brakes | Peacock |
| Heater equipment | Consolidated Car Heating |
| Headlights | General Electric |
| Journal bearings | A.E.R.A. standard |
| Journal boxes | Symington |
| Lightning arresters | General Electric |
| Motors | Four GE-265, inside hung |
| Registers | Ohmer |
| Safety devices | Safety Car Devices |
| Sanders | Osgood-Bradley |
| Sash fixtures | Curtain Supply |
| Seats | Heywood-Wakefield |
| Seating material | Leather |
| Slack adjuster | Osgood-Bradley |
| Springs | Fort Pitt and Railway Steel Spring |
| Step treads | Mason |
| Trolley retrievers | Earll |
| Trolley base | U. S. No. 20 |
| Trolley wheels | General Electric |
| Trucks | Osgood-Bradley OBC-48-66-G |
| Ventilators | Garland C-3 |
| Wheels | Steel Car Forge 26-in. diameter |



Type of double-truck interurban car recently delivered to the Berkshire Street Railway, Pittsfield, Mass.

## Bids for 100 Cars and Ten Buses for Detroit

The Department of Street Railways at Detroit, Mich., has been authorized and directed by the City Council to take bids upon 100 modern Peter Witt cars and ten single-deck, 30-passenger motor coaches for the purpose of making comparisons with the department's cost estimates for building cars of similar type. The new cars are required both to serve the longer lines that expansion into new territory brings and to replace equipment that is becoming obsolete.

Basing an estimate on a cost per car unit of $14,500 and a financing plan spread over a period of seven years with a down payment of 25 per cent and the balance bearing interest at 8 per cent, Del A Smith, general manager, cited that the cost per car would be approximately 7½ cents per mile. Taking into account the economic elements involved in these factors—seating capacity, weight per seat and cost of maintenance per year—the saving to the department would be 6.85 cents per mile, according to Mr. Smith, leaving a net cost to the department for this equipment of $182,000, or $1,820 a car.

In view of these facts and anticipating the availability of funds the commission requested permission for the taking of the bids for both the cars and buses. The bids for the cars, when received, will be compared with the department's own cost estimates for building a like type. It will be determined whether to acquire the rolling stock by purchase or to have it built by the department.

The purchase of new cars will mark a departure from the policy of Col. H. U. Wallace, former general manager, who planned to confine future purchases of rolling stock to buses. The present opinion of the management is that neither cars nor buses alone are sufficient for a complete, modern transportation system. The belief has been expressed by Mr. Smith that on certain lines buses are useful and necessary, but on other lines they can never take the place of rail transportation.

## $500,000 for Improvements in Parkersburg

Improvements and addition to the railway and bus lines in and about Parkersburg, W. Va., totaling approximately $500,000 are planned by the Monongahela West Penn Public Service Company if relief from paving costs is granted by the Legislature, C. H. Hardesty, local manager of the company, and Capt. G. M. Alexander, president of the system, have stated. The company's plans call for improvement to be started as soon as the relief is secured, with the program carried to completion about 1930 or 1931.

New cars and buses to be purchased will cost more than $315,000. Some of the new cars will be used to replace present equipment; others to provide additional service on existing lines. Present plans call for the purchase of about eighteen cars immediately upon word of granting the relief. Nearly $140,000 will be spent on reconstructing trackage and more than $20,000 will be required to rebuild overhead trolleys and to renew block signals and telephones. Tracks will be rebuilt on the principal streets of the city. New overhead will be provided where needed and additional block signals and telephones will be installed.

Buses will be purchased for use in territory not served by the railway or territory where it develops that bus service is needed in accordance with a thorough study of the transportation situation in Parkersburg and its suburbs, made by the management and the company's engineers.

# Copper Moving; Lead Weak

THE long-deferred buying movement in copper showed signs of materializing April 13, when a good tonnage was sold at 13 cents for Eastern deliveries. Zinc continues quiet at slightly lower prices, though the volume of sales was better than a week ago, according to *Engineering and Mining Journal*. Lead perhaps looks the weakest of any of the non-ferrous metals at the moment, business having been very poor lately. Tin has been a little lower for spot offerings, and consumers have bought somewhat more liberally for forward as well as prompt. Silver is back to 56¼ cents today after having been as high as 57⅛ cents. Antimony is distinctly stronger, being held at close to 15 cents.

Copper statistics which appeared April 13 showed a decline in refined stocks at the end of March from 105,020 to 102,637 tons and of blister from 272,219 to 260,225 tons, rather surprising in the case of blister. The rate of both domestic and export shipments improved by about 4 per cent over February. Refinery production rate decreased by close to 7 per cent and smelter production by almost 9 per cent. Mine production data are not yet available, but the indications are that the rate of mine production was cut at least 10 per cent in March. The favorable statistics stimulated demand on April 13, when more than 6,000 tons were sold, more than in some entire weeks recently. A large buying movement is overdue and may be getting under way. The foreign price was reduced on April 12 from 13.65 cents, c.i.f., to 13.50 cents. Export demand has been quiet.

Zinc has gradually weakened during the last seven days, dropping from 6⅞ cents, St. Louis, to 6.40 cents. In fact, some offers were made April 13 as low as 6⅜ cents. Business has been a little larger than last week, but is still below normal. The statistics are not particularly reassuring, showing practically the same rate of production in March as in February; shipments were also at about the same rate as in February. April production should be markedly less, owing to smelter curtailments in late March. At present prices it is felt zinc is scraping bottom, as ore is only $42 a ton. Below this, production is likely to be curtailed.

American Zinc Institute's statistics, in tons of 2,000 lb., follow:

| | |
|---|---|
| Stock, March 1 | 32,938 |
| Produced | 56,546 |
| Shipped | 53,205 |
| Stock, March 31 | 36,279 |
| Shipped from plant for export | 5,098 |
| Retorts operating, March 31 | 83,208 |

## ELECTRIC RAILWAY MATERIAL PRICES—April 15, 1927

### Metals—New York

| | |
|---|---|
| Copper, electrolytic, cents per lb. | 12.775 |
| Lead, cents per lb. | 7.25 |
| Nickel, cents per lb. | 35.00 |
| Zinc, cents per lb. | 6.75 |
| Tin, Straits, cents per lb. | 67.87 |
| Aluminum, 98 or 99 per cent, cents per lb. | 26.005 |
| Babbitt metal, warehouse, cents per lb.: | |
| Commercial grade | 61.00 |
| General service | 31.50 |

### Bituminous Coal

| | |
|---|---|
| Smokeless mine run, f.o.b. vessel, Hampton Roads | $4.375 |
| Somerset mine run, Boston | 2.00 |
| Pittsburgh mine run, Pittsburgh | 2.175 |
| Franklin, Ill., screenings, Chicago | 2.50 |
| Central, Ill., screenings, Chicago | 2.00 |
| Kansas screenings, Kansas City | 2.50 |

### Track Materials—Pittsburgh

| | |
|---|---|
| Standard steel rails, gross ton | $43.00 |
| Railroad spikes, drive, ⅜ in. and larger, cents per lb. | 2.90 |
| Tie plates (flat type), cents per lb. | 2.35 |
| Angle bars, cents per lb. | 2.75 |
| Rail bolts and nuts, cents per lb. | 3.95 |
| Steel bars, cents per lb. | 1.90 |
| Ties, white oak, Chicago, 6 in.x8 in.x8 ft. | $1.45 |

### Hardware—Pittsburgh

| | |
|---|---|
| Wire nails, base per keg | 2.55 |
| Sheet iron (24 gage), cents per lb. | 2.75 |
| Sheet iron, galvanized (24 gage), cents per lb. | 3.65 |
| Galvanized barbed wire, cents per lb. | 3.25 |
| Galvanized wire, ordinary, cents per lb. | 2.40 |

### Waste—New York

| | |
|---|---|
| Waste, wool, cents per lb. | 12–18 |
| Waste, cotton (100 lb. bale), cents per lb.: | |
| White | 12–17.50 |
| Colored | 7–14 |

### Paints, Putty and Glass—New York

| | |
|---|---|
| Linseed oil (5 bbl. lots), cents per lb. | 10.90 |
| White lead in oil (100 lb. keg), cents per lb. | 14.50 |
| Turpentine (bbl. lots), per gal. | $0 71 |
| Putty, 100 lb. tins, cents per lb. | 5.25–5.50 |

### Wire—New York

| | |
|---|---|
| Copper wire, cents per lb. | 14.875 |
| Rubber-covered wire, No. 14, per 1,000 ft. | $5.50 |
| Weatherproof wire base, cents per lb. | 16.75 |

### Paving Materials

| | |
|---|---|
| Paving stone, granite, 5 in. New York—Grade 1, per thousand | $130 |
| Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd. | $2.70 |
| Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots | 51.00 |
| Paving brick 3x8½x4 N.Y., per 1,000 in carload lots | 45.00 |
| Crushed stone, ¾-in., carload lots, N. Y., per cu.yd. | 1.94 |
| Cement, Chicago consumers' net prices, without bags | 2.05 |
| Gravel, ¾-in., cu.yd., f.o.b. N. Y. | 1.75 |
| Sand, cu.yd., f.o.b. N. Y. | 1 00 |

### Old Metals—New York and Chicago

| | |
|---|---|
| Heavy copper, cents per lb. | 10.75 |
| Light copper, cents per lb. | 9.25 |
| Heavy yellow brass, cents per lb. | 6.75 |
| Zinc, old scrap, cents per lb. | 4.00 |
| Lead, cents per lb. (heavy) | 5.875 |
| Steel car axles, Chicago, net ton | $17.75 |
| Cast iron car wheels, Chicago, gross ton | 15.50 |
| Rails (short), Chicago, gross ton | 17.25 |
| Rails, (relaying), Chicago, gross ton (65 lb. and heavier) | 28.50 |
| Machine turnings, Chicago, gross ton | 7.75 |

Gradual recession in prices in the St. Louis district has been the feature of the domestic lead market during the week. As early as April 8 sales were made at 6.95 cents and on April 13 the leading interest reduced its price to that level, the price on the latter date going as low as 6.90 cents. American Smelting & Refining Company has maintained its price all week at 7.25 cents, and scattering sales at 7.20 cents were offset by others that brought a small premium.

Tin buying on the part of consumers has been in moderate volume for May and June, with some for prompt delivery. The price tendency has been generally downward in the domestic market, though a 30 shilling rise in London on April 13 stiffened prices here, prompt Straits being sold at 68 cents.

## New Trackwork Underway in Minneapolis

Work began this week on the 1927 program of the Minneapolis Street Railway, Minneapolis, Minn., covering improvements and extensions to cost $654,900. Improvements started with an extension of the Kenwood-25th Street line at the east end across the new bridge over the Mississippi river, making a new connection with St. Paul at the Ford Motor Company plant where the Randolph Street line of the St. Paul City Railway ends. Double track will be laid on 50th street from Penn Avenue South, making connection at Bryant Avenue with the Bryant-Johnson line, including double tracking the line from Xerxes avenue to Penn; single track from 50th to 54th Streets on Penn Avenue, etc.

A. C. Godward city planning engineer, has been authorized to complete survey of the cost of extending the Franklin Avenue line east to connect with the Rondo-Maria line of the St. Paul City Railway to make a fourth through interurban.

## *Rolling Stock*

**Southwest Missouri Railroad, Webb City, Mo.,** has placed an order with the American Car Company, St. Louis, Mo., for one 50-ft. double-end passenger motor car.

**Portland Electric Power Company, Portland, Ore.,** will place in service about May 15 eight new 33-passenger buses, costing approximately $90,000, according to W. H. Lines, vice-president. The equipment will be operated over the Ross Island Bridge to serve the Mount Scott district. The buses are being provided in accordance with the company's new franchise which stipulates better service for the outlying districts.

**Fitchburg & Leominster Street Railway, Fitchburg, Mass.,** is repeating the order placed last fall with the Wason Manufacturing Company for four light-weight motor passenger cars. The four cars originally ordered in October, 1926, and placed in service on Jan. 1, 1927, proved so satisfactory that an order for four more cars of the same type was placed in February, 1927, for delivery in April. Specifications follow:

| | |
|---|---|
| Seating capacity | 40 |
| Total weight | 26,000 lb. |
| Bolster centers, length | 17 ft. 8 in. |
| Length over all | 36 ft. 10 in. |
| Truck wheelbase | 4 ft. 10 in. |
| Width over all | 8 ft. 1 in. |
| Height, rail to trolley base | 10 ft. 11 in. |
| Body | Steel |
| Interior trim | Mahogany |
| Headlining | ¼-in. Agasote |
| Roof | Arch |
| Air brakes | General Electric |
| Fare boxes | Johnson |
| Headlights | Golden Glow, city type |
| Motors | General Electric 265, 35 hp., inside hung |
| Paint | Pratt & Lambert and Sherwin-Williams |
| Sanders | Air, Wason Company |
| Seats | J. G. Brill Company |
| Seating material | Leather |
| Trolley catches | Ohio Brass Company |
| Trolley base | Ohio Brass Company |
| Trolley wheels | Ohio Brass Company |
| Trucks | J. G. Brill Co. 177 Ex |
| Wheels | 27-in. J. G. Brill Co. rolled steel |

## *Trade Notes*

**O. M. Edwards Company, Syracuse, N. Y.,** announces the appointment of H. A. Cronmiller as Eastern representative of the company with offices at 412 Broadway, New York City. Mr. Cronmiller succeeds A. J. Hogan.

**Canton Culvert & Sno Company, Canton, Ohio,** has received an order from the government of Colombia, South America, for immediate shipment of 750 tons of "Acme" (Nestable) toncan iron corrugated culverts, to be used in highway construction in that country. This is believed to be the largest single order for corrugated culverts ever awarded to any corrugated culvert manufacturing company in the United States. It represents a shipment of 42 carloads.

**General Electric Company** announces the sale of the entire Sprague hoist business to the Shepard Electric Crane & Hoist Company, Montour Falls, N. Y. This includes the right to manufacture and sell Sprague electric hoists and winches as built and sold from 1903 to 1923 by the Sprague Electric Works of the General Electric Company and from 1923 to date by the General Electric Company.

**L. B. Foster Company,** distributor of steel rails and complete track equipment, has opened offices in the Illinois Merchants Bank Building, Chicago. Adequate warehouse and storage yard facilities have also been provided and plants for the housing of fabricating and reclaiming machinery are in process of erection, so that a complete service can be had, and material shipped, from this point. The Chicago office will be under the management of Reuben A. Foster, vice-president of the firm. The L. B. Foster Company has offices, plants and warehouses in Pittsburgh, Jersey City, Baltimore, Hamilton, Ohio, Roanoke, Virginia and Chicago.

**Pittsburgh Testing Laboratory, New York, N. Y.,** announces the removal of its offices from 50 Church Street and its laboratory from 35 Sixth Avenue, to its new laboratory and offices at 72 Washington Street. The most improved types of accurate physical testing machines and chemical apparatus have been installed. The facilities have been greatly improved and the scope of service enlarged to serve better its clients. This company, with its main office in Pittsburgh, has branch offices in the principal cities of the United States and facilities for inspection and testing abroad.

**John R. Hayward** of Roanoke, Va., will on April 1 succeed Frank N. Grigg of Washington, D. C., as Southeastern railway sales manager of the Heywood-Wakefield Company. Mr. Grigg has represented the Heywood-Wakefield Company for many years and is now retiring because of his health.

**R. H. Beaumont Company, Philadelphia, Pa.,** announces it has taken over the business of the American Manufacturing & Engineering Company, Kalamazoo, Mich. Products formerly manufactured by this company, including the American slack line cableway excavator, will now be manufactured by the R. H. Beaumont Company. The addition of the American slack line cableway excavator to the Beaumont line, which already includes the Beaumont LeClair cable drag scraper, completes a full line of equipment for the elevating and storing of sand, gravel, stone and kindred materials. The R. H. Beaumont Company will sell the complete system for this service, including the hoist.

## *New Advertising Literature*

**Sullivan Machinery Company, Chicago, Ill.,** has published new editions, enlarged and improved, of two of its bulletins on concrete breakers and on electric portable hoists. Second edition, 81-I, describes two types of tools, a 75-lb. or heavy-duty Buster and a 48-lb. light Buster. The bulletin is liberally illustrated to show different applications of concrete breakers. Second edition, 76-G, is a sixteen-page pamphlet describing Sullivan single and double drum, electric portable hoists. This also is liberally illustrated. Copies may be secured on application to the company at 122 South Michigan Avenue, Chicago.

**J. G. Brill Company, Philadelphia, Pa.,** is mailing out an attractive folder giving operating statistics on cars furnished for the Warren & Jamestown Street Railway, Cumberland Traction Company, Lewistown & Reedsville Electric Railway and Milford & Oxford Street Railway. All the cars that are featured are of the light-weight modern type.

**O. M. Edwards Company, Inc., Syracuse, N. Y.,** through its metal sash department is issuing a new folder describing the application of Edwards metal sash to modern bus bodies.

**Carnegie Steel Company, Pittsburgh, Pa.,** has issued an attractive leather-bound book of 172 pages, giving dimensions and other information on Carnegie beam sections. The series of beams now placed on the market provide a series of shapes which combine sound engineering principles with practical improvements. The new beam sections are explained under the following captions: Contour Design, Web and Flange Ratio, Range of Sizes, Progressive Beam Designs and Improved Column Design.

# Dependability

Modern cars are built using only equipment of proven dependability. That must be the reason why nearly all modern cars are equipped with

# "PEACOCK" STAFFLESS BRAKES!

REG. U.S. PAT. OFF.

They are dependable brakes! There are many other reasons which make them especially desirable on modern cars. May we tell you about them? Or, let us send you a Peacock Staffless Brake to test. Try it out in fair competition with any other brakes. Slack off the brake until full piston travel is required to set brake; release air brakes; then try to set hand brake.

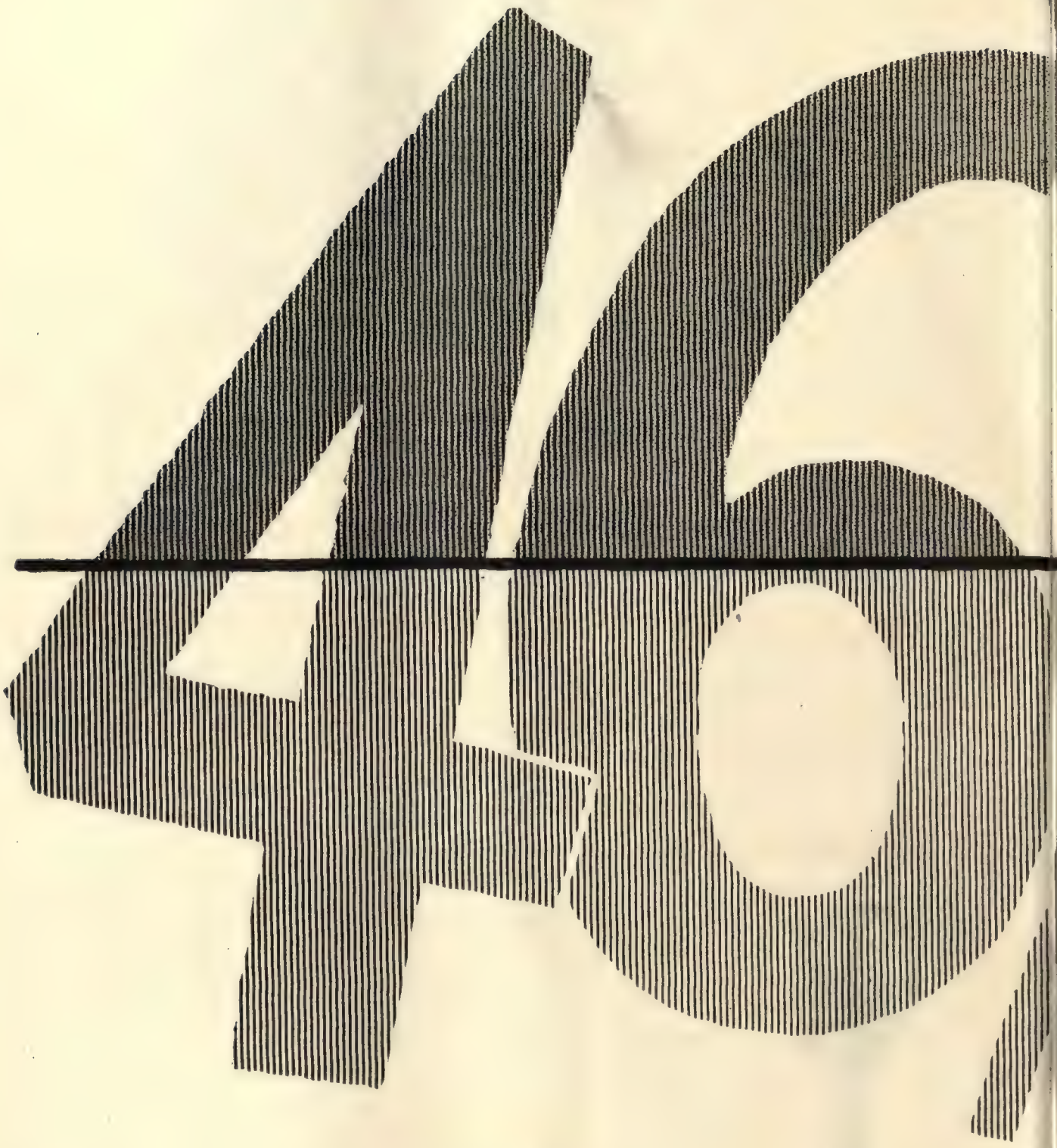
*Will it hold?*

## National Brake Company, Inc.

**890 Ellicott Square, Buffalo, N. Y.**

*Canadian Representative*

**Lyman Tube & Supply Co., Ltd., Montreal, Can.**



# Almost half of all the Street Railway Companies who bought Buses in 1926 *bought*

# YELLOW COACHES

*A General Motors Product*

YELLOW KNIGHT

"Our tire and repair costs have been reduced 25% since we have standardized on Budd Duals", say Mellway Brothers, fleet operators, of Toronto, Canada. That's a saving Budd Duals bring every bus operator—one size tires, one size wheels, all interchangeable, front and rear, and interchangeable throughout the fleet.

BUDD
WHEEL COMPANY
*Detroit*

101 YEARS OF MANUFACTURING EXPERIENCE

Cane Webbing may be ordered through any H-W sales office.

No. 327-M

# FOR INTERURBAN NEEDS

THIS Heywood-Wakefield seat is designed for the modern type of interurban service where comfort is now so important. It has been selected for both new cars and for replacement use.

It has deep, double spring cushions shaped to allow more leg freedom. Mechanism rails are set in. The individual backs are properly pitched for comfort.

Our car seating experts will be glad to help you decide on the best seating equipment for your needs. This service is free through any H-W sales office.

*If you have not received a copy of our new Bus Seat Catalogue, write for it.*

Heywood-Wakefield
REG. U.S. PAT. OFF.

Heywood-Wakefield Co., Wakefield, Mass.; 516 West 34th St., New York, N. Y.; 439 Railway Exchange Bldg., Chicago, Ill. H. G. Cook, Hobart Bldg., San Francisco, Cal. The G. F. Cotter Supply Co., Houston, Texas. F. N. Grigg, 630 Louisiana Ave., Washington, D. C. The Railway & Power Engineering Corp., 133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada.

*One of the Goodyear-equipped fleet of buses of the Miami Beach Railway Company, Miami, Florida*

GOODYEAR

Copyright 1927, by The Goodyear Tire & Rubber Co., Inc

# "Wonderful Service and Freedom from Failures"

Forty-one of the fifty buses operated by the Miami Beach Railway Company, Miami, Florida, are equipped with Goodyear Pneumatic Bus Tires, and the remainder are being put on Goodyears as fast as tire equipment needs replacing.

The road conditions over which the fleet operates are good, and exceptional mileages from the Goodyears in this service are the rule.

* * *

"Due to the exceptional low mileage costs we have obtained through the use of Goodyear Bus Tires, we are now equipping our entire fleet with Goodyears," writes Mr. A. L. Reynolds, Manager of the Miami Beach Railway Company.

"The wonderful service and freedom from tire failures en route has more than come up to our expectations on this type of tire.

"To any operator who wants to lower his tire expense per mile, we gladly recommend Goodyear Bus Tires."

* * *

Goodyear Pneumatic Bus Tires deliver a high standard of tire performance. They give high mileages, and they give them dependably, with a high percentage of freedom from trouble. They do this at a low cost per tire mile.

Made with the famous All-Weather Tread, Goodyear Pneumatic Bus Tires possess great tractive power and provide an extra measure of security under all conditions.

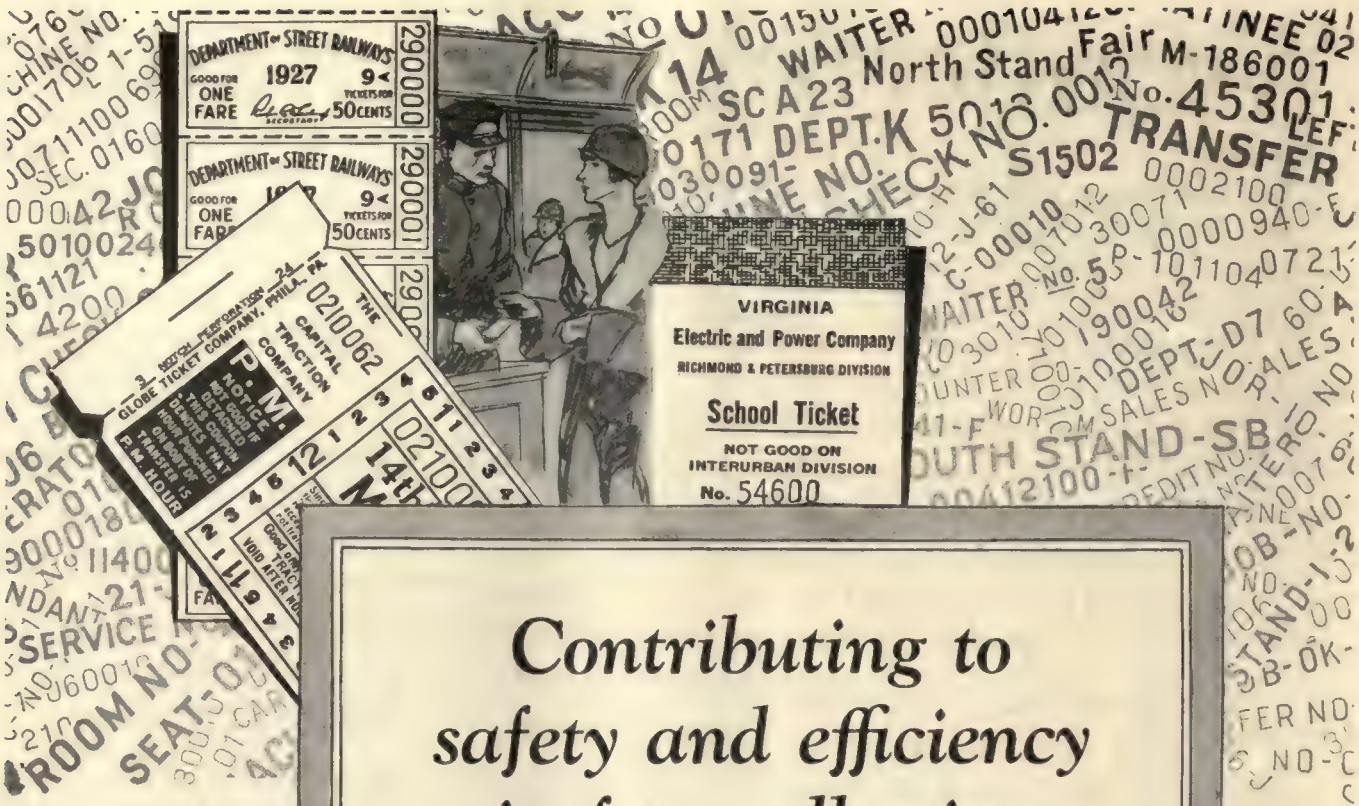
Made with SUPERTWIST, the extra-elastic, extra-durable cord fabric developed by Goodyear for Goodyear Tires, Goodyear Pneumatic Bus Tires give long, economical wear.

Only Goodyear Tires are made with the All-Weather Tread and with SUPERTWIST casings. Only Goodyear Tires, therefore, can give you the advantages of SUPERTWIST and the All-Weather Tread. Yet they cost you no more.

*For every Goodyear Cord Bus Tire there is an equally fine Goodyear Tube, built especially to the needs of bus service*

# BUS TIRES

*Made with SUPERTWIST*




# *Contributing to safety and efficiency in fare-collecting*

THE notched perforation and the P. M. Coupon Transfer—as used today by transportation companies throughout the country—were originated by Globe ticket specialists. The one saves time for conductors and passengers, the other saves thousands of dollars daily on transfers issued with a time limit.

These are but two examples of Globe leadership in the design and production of serially numbered fare tickets, cash fare receipts, transfers, etc.

We specialize in the production of every type of numbered ticket for transportation companies. Our equipment and experience assure accuracy, quality and satisfactory service. Consult us about designs and estimates.

Specialists for half a century

# Globe
## TICKET COMPANY

112 North Twelfth Street
PHILADELPHIA

BALTIMORE CLEVELAND LOS ANGELES NEW YORK

# Lower Maintenance Costs are SKIN DEEP!

*This is the second of a series of "SKIN DEEP" advertisements on leather upholstery for electric railway cars and buses. The third will appear in an early issue.*

The use of Cleveland Tanning Co. leather in the upholstery of your cars or buses *does* lower maintenance costs; by lasting longer and costing less per mile to use, by increasing the popularity of your line through attractive car or bus interiors, and by being much easier to keep clean and attractive.

Leather seats give more wear per dollar and present an appearance that invites passengers into your cars or buses. Maintenance costs tumble and profits rise.

Supplied as complete hides, or cut to any pattern; five famous grades: Hyaline Grains, Alpha Grains, Hand Buffs, Machine Buffs and Special Machine Buffs. Color and finish according to your specifications. We will be pleased to send you samples.

NOTHING TAKES THE PLACE OF LEATHER

HYALINE

The Cleveland Tanning Co.
Dennison Ave. and Jennings Rd., Cleveland, O.

*Western Representatives:*
Midgeley & Borrowdale
McCormick Bldg., Chicago

*Eastern Representatives:*
Sisson Supply Co.,
1845 Grand Central Terminal, New York

# HYATT BEARINGS
## *for 120 more*
## *Chicago & North Western Coaches*

CHICAGO AND NORTH WESTERN LINE

## *. . . the Largest anti-friction journal order ever placed for suburban train service*

Every year since 1923 the Chicago & North Western has been adding more and more Hyatt equipped rolling stock to its service and now, after four years of gratifying experience, has standardized on Hyatts for 120 new passenger coaches.

Uninterrupted bearing service through elimination of hot boxes—greater mileage at lower cost—smoother starts—quicker acceleration—worthwhile oil savings. All these Hyatt contributions have resulted in new measures of operating efficiency and economy.

All industry has depended largely on Hyatt's bearing building experience, its facilities and resources, during the last 36 years. You can inform yourself as to the exact advantages by consulting a Hyatt engineer.

HYATT ROLLER BEARING COMPANY

NEWARK DETROIT CHICAGO PITTSBURGH
WORCESTER PHILADELPHIA OAKLAND CLEVELAND

HYATT
ROLLER BEARINGS
PRODUCT OF GENERAL MOTORS

HYATT Roller Bearings are successfully operating on about 50 different railroads throughout the country. A Chicago, Milwaukee and St. Paul car with Hyatts in the journal boxes has reached the total of 300,000 miles to date.

Hyatt boxes fit A. R. A. standard pedestals.

# Profit Earning Cars

MODERN CARS, embodying every improvement in design and construction operate at less cost and attract increased patronage. Cummings Car and Coach Company have the necessary experience and facilities to render you helpful service in modernizing your equipment.

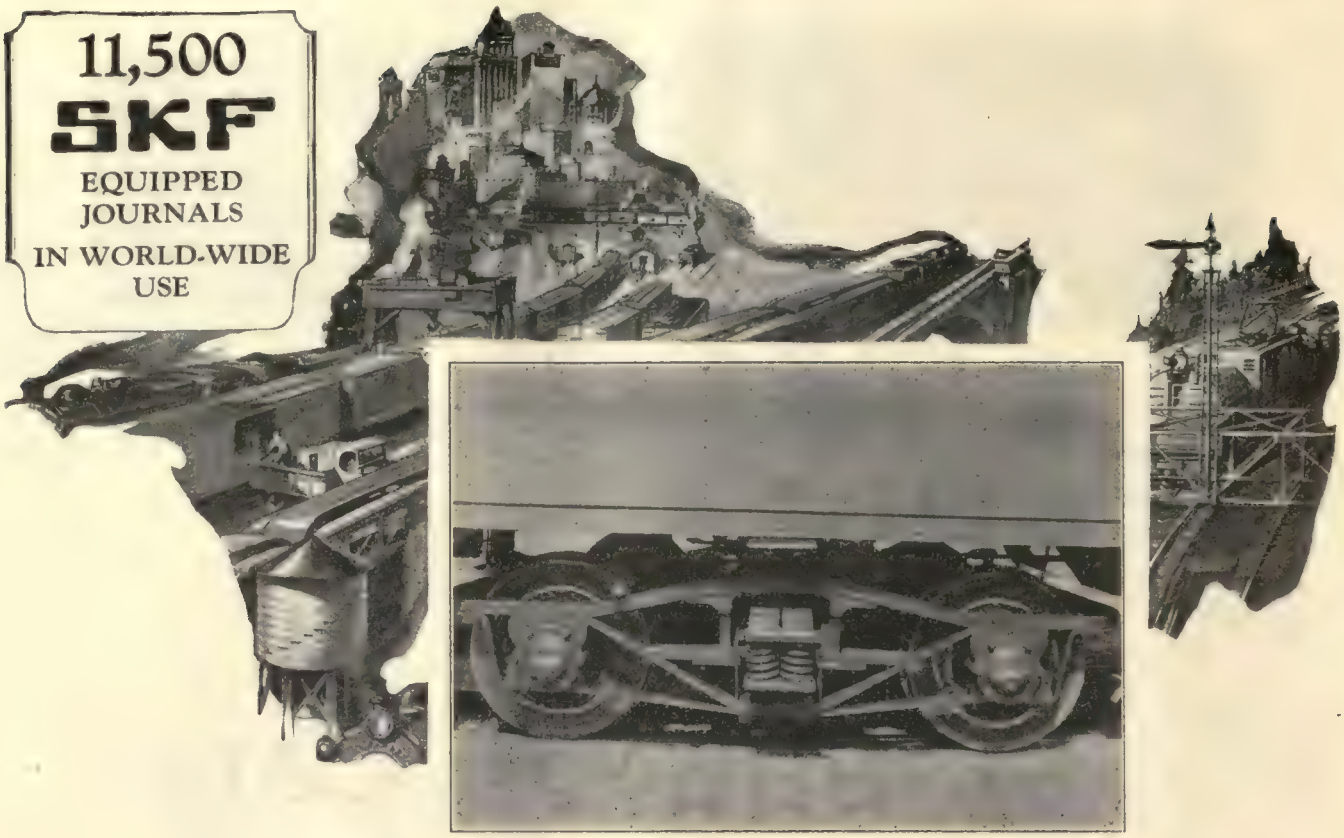
The Cummings Gas Electric Coach is a product of twenty years' experience in building fine rolling stock for electric railways, combined with the latest development in motive power for automotive vehicles.

## CUMMINGS CAR AND COACH CO.

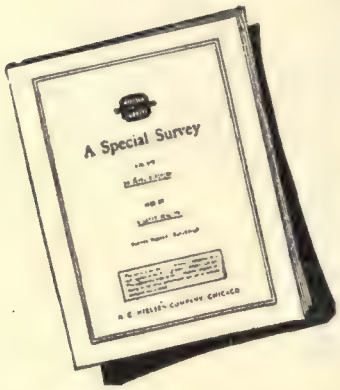
*Successors to McGuire-Cummings Mfg. Co.*

111 W. Monroe St., CHICAGO

11,500
SKF
EQUIPPED
JOURNALS
IN WORLD-WIDE
USE



# Time Etches a Strong Trend To SKF Journals On The Modern Car




*Certified Survey No. 1776 in your Industry or one closely related to it Sent on Request.*

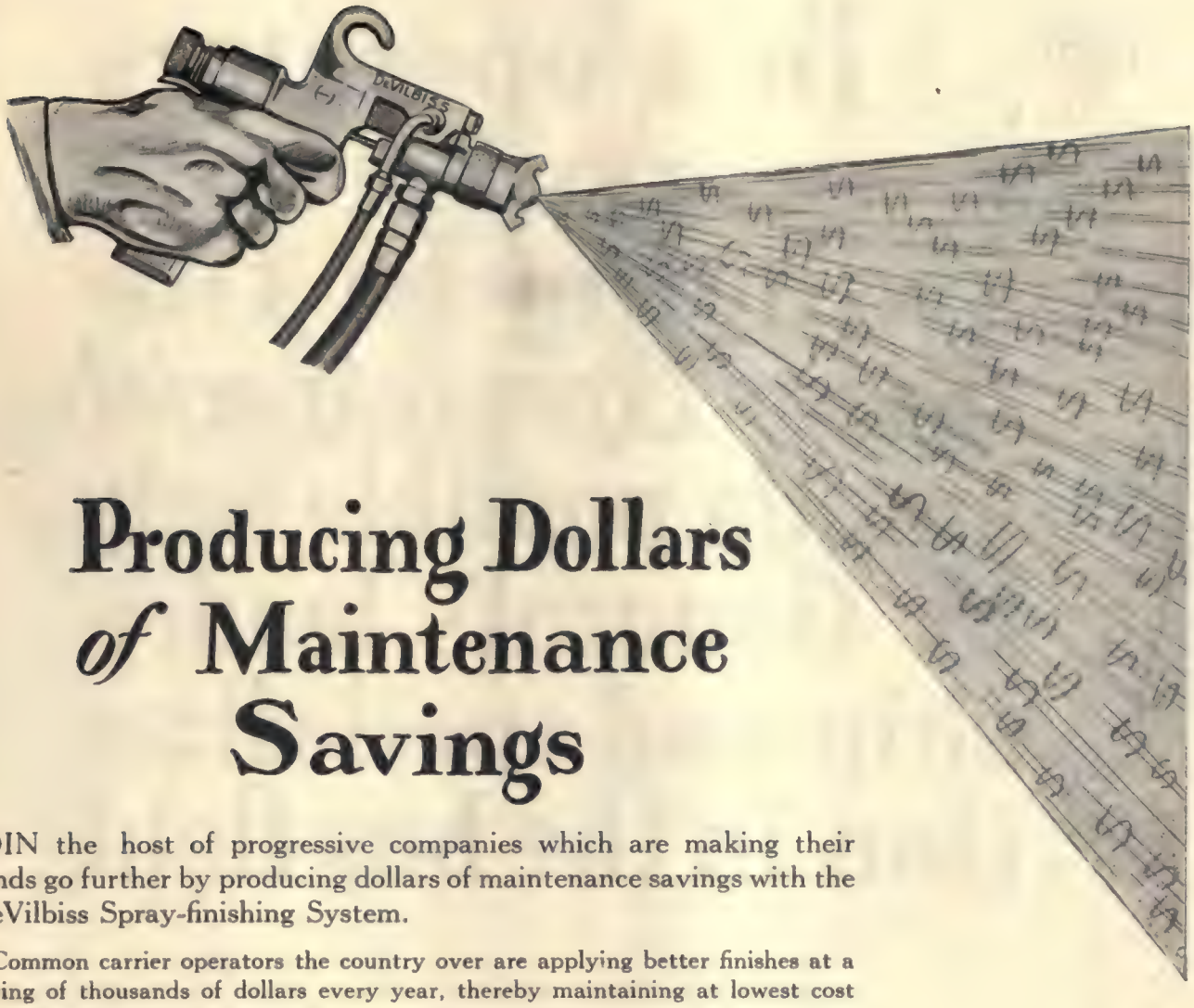
SPEED and ease of acceleration bear a direct relation to the reduction of wasteful friction to a minimum in railway journals. SKF Journal Bearings, in their out-of-sight way, are playing a part of ever-increasing importance towards improved operation and development of the modern street car.

On the job shown above, in operation since 1925, SKF Journal Bearings are proving a worthwhile investment. The car weighs 33,000 pounds, is driven by four 35 H.P. motors, seats 46 and has a total capacity of 100 passengers. In addition to smoother operation, lower power demand and long life, the bearings are protected against all destructive matter and need lubricant about three or four times a year.

SKF INDUSTRIES, INCORPORATED
S. E. cor. Madison Avenue, at 34th Street, New York City 1776

Ball Bearings

Roller Bearings




# Producing Dollars *of* Maintenance Savings

JOIN the host of progressive companies which are making their funds go further by producing dollars of maintenance savings with the DeVilbiss Spray-finishing System.

Common carrier operators the country over are applying better finishes at a saving of thousands of dollars every year, thereby maintaining at lowest cost the passenger attracting qualities of car and bus equipment.

Dress up equipment and keep it dressed up. You'll attract more business and attract it at a fraction of your former cost.

Whether you use varnishes or lacquers, the same results are to be had with the DeVilbiss spray-finishing equipment. After the purchase, DeVilbiss equipment and service organization never quit working for you.

Let DeVilbiss engineers, with their long years of experience in a wide range of finishing and painting problems, work with you. They are well qualified to recommend the most efficient and economical equipment for your needs.

Full particulars will be gladly mailed to you. Address—

THE DeVILBISS CO. 272 Phillips Ave. TOLEDO, OHIO
New York — Philadelphia — Chicago — Detroit — San Francisco — Cleveland
Indianapolis — St. Louis — Milwaukee — Minneapolis — Windsor, Ontario

## DeVilbiss
## Spray-finishing System

**For more than 35 years the name DeVILBISS has stood for practical, honest and dependable products**

# Bus operators everywhere are swinging to the *Heavy Express Special* -made possible only by General's leadership and specialization in the bus field

-better buy Generals NOW than *buy and buy*

*The*

# GENERAL TIRE

*—goes a long way to make friends*

BUILT IN AKRON, OHIO, BY GENERAL TIRE AND RUBBER CO.

# *Give them*
# MORE FREQUENT SERVICE

# Better headway

# GRAHAM BROTHERS
## SOLD BY DODGE BROTHERS

# at lower costs

## *Graham Brothers 21-Passenger Motor Coaches make possible the frequent service that attracts patronage—that fosters the coach riding habit.*

They ride—and ride again. When they feel confident of a safe, comfortable ride in a good-looking motor coach, ready when they are, your casual patrons become steady passengers.

Graham Brothers Motor Coaches are attractive. They are safe, comfortable, fast and dependable. Being of medium capacity they carry no excess weight of body or chassis and they haul fewer empty seats. They reduce waste transportation to the minimum.

Graham Brothers Motor Coaches are ruggedly built. They stand up—mile after mile, year after year. Operating and maintenance costs are low. Service is available always and everywhere—no waiting for repair parts, no delays.

*Standard 21-Passenger street car type, complete,* $3815
*12-Passenger Parlor Coach, complete,* $3750
*16-Passenger Parlor Coach, complete,* $3995
*Prices f. o. b. Detroit*

# MOTOR COACHES
## DEALERS EVERYWHERE

# COMPLETE UNIT

Purchasers of Graham Brothers Motor Coaches get the complete unit—chassis and body—from one source. There is no division of responsibility.

The complete coach is built by Graham Brothers—assurance of fine materials and workmanship and correctness of design and engineering.

The complete coach is sold by Dodge Brothers Dealers—saving the purchaser time and money and eliminating the confusion attendant upon scattered buying.

The complete coach is serviced by Dodge Brothers Dealers—everywhere.

GRAHAM BROTHERS

EVANSVILLE – DETROIT – STOCKTON

A DIVISION OF DODGE BROTHERS, INC.

GRAHAM BROTHERS (CANADA) LIMITED, TORONTO, ONTARIO

900-D
Double Rotating Chair

# H-K Seats on the new cars for the W.B. & A.R.R.

The ten new articulated cars recently placed in high speed interurban service by the Washington, Baltimore and Annapolis Railroad have plush covered Hale-Kilburn Seats for luxurious comfort and appearance.

This No. 900 rotating double chair has curved back heavily padded, individual spring cushion seat pads and individual arm rests at each side. The chair is designed to rotate within ordinary car seat centers with a pedestal device for rotating to opposite position.

Other H-K Seats are equally well adapted for various types of service. Full information on request.

## HALE-KILBURN COMPANY

***General Offices and Works:*** **1800 Lehigh Avenue, Philadelphia**

**SALES OFFICES:**

Hale-Kilburn Co., 30 Church St., New York
Hale-Kilburn Co., McCormick Bldg., Chicago
E. A. Thornwell, Candler Bldg., Atlanta
Frank F. Bodler, 903 Monadnock Bldg., San Francisco
T. C. Coleman & Son, Starks Bldg., Louisville
W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
H. M. Euler, 46 Front St., Portland, Oregon

**Hale and Kilburn SEATS**

# No man is big enough to sing a duet

YOU are in charge of certain equipment. And because that's your job, you know more about it than anyone else. But you simply cannot know thoroughly *all* the fundamentals of *every* branch of your work; no man can.

Take the lubrication of that equipment, for instance. You know that end of it pretty well.

But can you possibly know it as well as a group of men who have spent years in perfecting their knowledge of this highly specialized branch of engineering science? And mark you, we say a group because "no man can sing a duet." And so when a Texaco Lubrication Engineer makes a recommendation as regards the kind or quantity of lubricating oil to use, he is speaking with more than the authority of his own experience. Back of him is the collective experience of a group of men who have been testing and observing lubricants on every possible type of power unit or machine in the country—in fact all over the world.

So, if you have any lubrication problem—and every road has them once in a while—talk to our engineers about the matter. Or write us.

Most careful attention will be given to any communication of this nature and we know that we can furnish a prompt and satisfactory solution to any problem relating to the selection of lubricants for any purpose. Do not hesitate to call on us. That is what we are here for.

And remember:

***There is a Texaco Lubricant for Every Purpose***

THE TEXAS COMPANY

*Texaco Petroleum Products*

Dept. E42, 17 Battery Place, New York City

OFFICES IN PRINCIPAL CITIES

# "STANDARD" STEEL WHEELS

ADD TO THE LUXURY AND SAFETY

OF THESE NEW WASHINGTON, BALTIMORE AND ANNAPOLIS ARTICULATED CARS

EVERY provision has been made for the luxury and comfort of the rider in these ten new Pullman type articulated cars. At the same time, safety and economy in service have by no means been neglected and "Standard" Rolled Steel Wheels were chosen to withstand the rigors of this high-speed interurban service.

## STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
ST. LOUIS
NEW YORK

HOUSTON, TEXAS
PORTLAND, ORE.
RICHMOND, VA.

SAN FRANCISCO
ST. PAUL, MINN.
PITTSBURGH, PA.

WORKS: BURNHAM, PA.

# Prepare for Profits

Spring is here, and summer is on the way. The bus operator's big season is at hand.

To get the greatest possible profits during the coming season, you must be sure the motor fuel you are using is the one which gives you the greatest mileage and the most efficient operation.

Now is the time to decide on your fuel. A few hours spent in making tests now may save you a good many dollars during the summer.

The Standard Oil Company (Indiana) invites you to test Red Crown Gasoline against any other motor fuel on the market. Compare the mileage you get from a measured gallon of Red Crown against the mileage given by any other gasoline. Compare the operation of the motor; the speed and smoothness of acceleration.

## RED CROWN GASOLINE

equals or exceeds in every particular the Government specifications for good gasoline. It has a low initial boiling point to insure quick starting, a carefully graduated chain of intermediate fractions to give smooth and rapid acceleration, and sufficient heavy fractions for full power and long mileage. Red Crown will help you to make this season a profitable one.

## STANDARD OIL COMPANY

(INDIANA)

**General Offices: 910 S. Michigan Avenue CHICAGO, ILLINOIS**

ILLINOIS
Chicago
Decatur
Joliet
Peoria
Quincy

INDIANA
Evansville
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South Bend

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Davenport
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Huron

MICHIGAN
Detroit
Grand Rapids
Saginaw

N. DAKOTA
Fargo
Minot

WISCONSIN
La Crosse
Milwaukee

MINNESOTA
Duluth
Mankato
Minneapolis

MISSOURI
Kansas City
St. Joseph
St. Louis

# Thermit—
# such perfect track!

HAVE you ever ridden on the cars of the Capitol Traction Company? Or noticed them passing by?

If so you've probably marveled at the smooth quiet way they roll along! The highest standard of track maintenance must be observed in the shadow of the Nation's Capitol.

It is interesting, therefore, to note that the Capitol Traction Company Thermit Welded the track constructed in 1926 on famous Pennsylvania Avenue directly in front of the Capitol grounds.

*Decide on Thermit—when the Spring budget plans are made.*

THERMIT

THERMIT

**METAL & THERMIT CORPORATION**

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

# *This Isn't the Bridge of Sighs*

It is the St. Petersburg Million Dollar Pier of beauty, light and economy. Its appearance and usefulness are enhanced by Elreco Tubular Steel Poles.

This architectural triumph was not to be spoiled by a mob of unsightly uneconomical wooden poles carrying a mess of wires.

Observe the trim appearance of the Elreco Poles, the Novalux Lighting Units and the wires strung unobtrusively at the top.

Such an ensemble of Elreco Steel Poles is naturally more economical to install and less expensive to maintain. With three or four companies using the same poles the cost to each is, of course, much less.

There are other advantages of Elreco Poles too numerous to mention in this limited space. Why not get all the information? It's yours for the asking. Then specify Elreco Tubular Steel Poles on your next job.

ELRECO POLES

## *The Electric Railway Equipment Co.*

2900 Cormany Ave., Cincinnati, Ohio 30 Church St., New York

Interior View of One of Bethlehem Track Layout Buildings

# *Workmanship and Quality*

Laying out and fitting of special layouts and trackwork for Electric Railways necessitates extreme accuracy.

All Trackwork is manufactured complete within the Bethlehem organization, thus permitting control over quality and workmanship. Special work jobs are assembled in large well lighted buildings especially equipped for such work—an exclusive Bethlehem feature.

## Condensed List of Railway Equipment

Special Trackwork
Tee Rails
Girder Rails
Special Splice Bars for Welding

Machine Fitted Joints
Abbott and Center Rib Base Plates
Pole Line Material

Tie Rods
Bolts
Rolled Steel Wheels
Forged Axles

BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

DISTRICT OFFICES:

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh Buffalo Cleveland
Detroit Cincinnati Chicago St. Louis San Francisco Los Angeles Seattle Portland

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

# BETHLEHEM

# HOW LONG

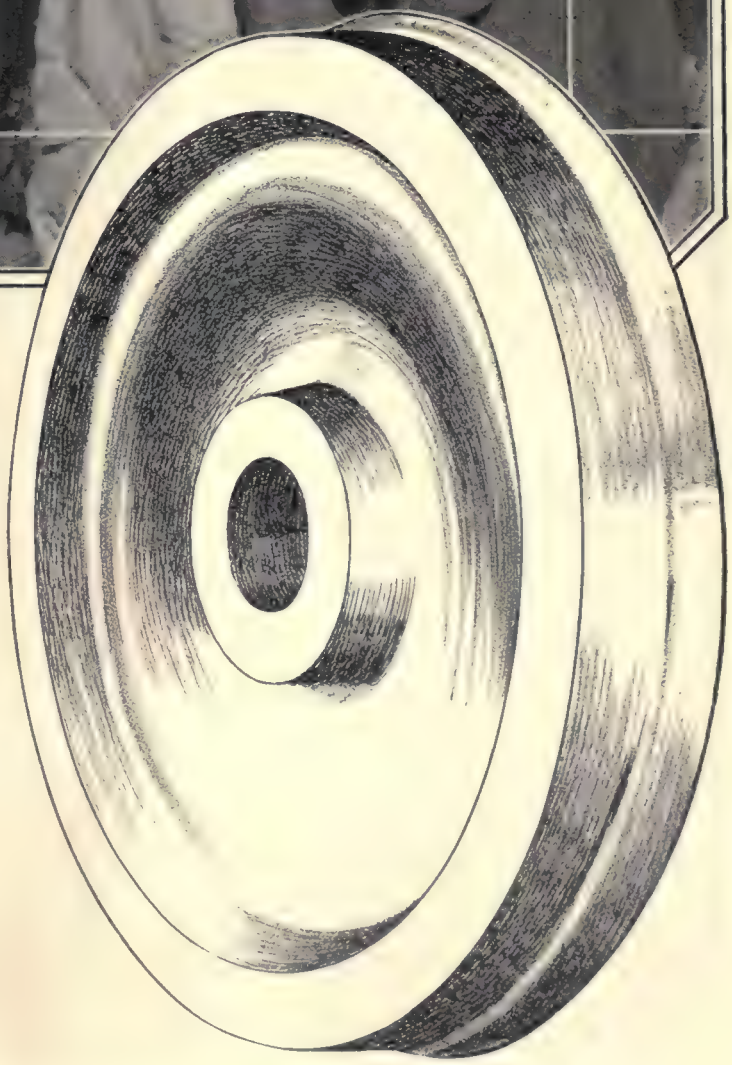
## Should Brake Shoes Wear?

American Brake Shoes need only wear slightly longer than others in order to repay the difference in price. From that point on they *save* you money —not only in the *material* cost of brake shoes but in the *labor* cost of shoe replacement. Three months' trial will show you that one shoe is lasting longer than another in doing the same work. Do you buy brake shoes for their cost per pound or cost per foot pound of delivered work?

*"Best by Test"*

**THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY**

**30 CHURCH ST., NEW YORK**
**332 SO. MICH. AVE., CHICAGO**




## It's the *Coach* That Carries the Crowd . . . . . But It's the *Wheels* That Carry the Coach

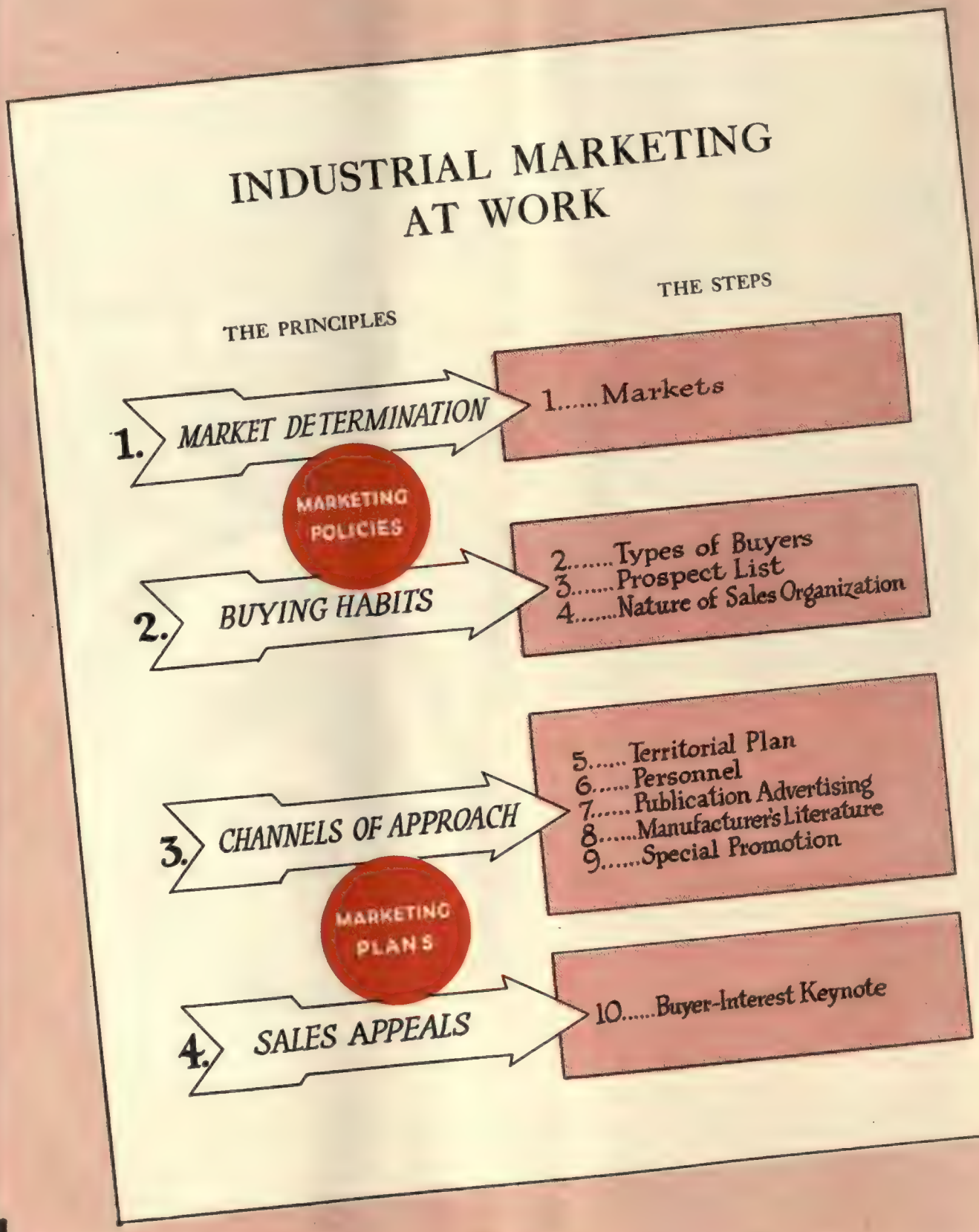
And so, in electric railway service, with its steep peak periods and the ever recurring emergencies that heavy traffic creates, the best wheel made is only good enough.

Gary Wrought Steel Wheels are manufactured in quantity but under a system of individual attention that assures the same physical and chemical precision as if only one wheel were made each day.

Our wheel specialists are at your command.

**Illinois Steel Company**

General Offices:
208 South La Salle Street
Chicago, Illinois


INDUSTRIAL MARKETING AT WORK
THE PRINCIPLES
THE STEPS
1. MARKET DETERMINATION
1.....Markets
MARKETING POLICIES
2. BUYING HABITS
2.....Types of Buyers
3.....Prospect List
4.....Nature of Sales Organization
3. CHANNELS OF APPROACH
5.....Territorial Plan
6.....Personnel
7.....Publication Advertising
8.....Manufacturer's Literature
9.....Special Promotion
MARKETING PLANS
4. SALES APPEALS
10.....Buyer-Interest Keynote

# "Can WE apply the McGraw-Hill Four Principles to OUR Industrial Selling?"

Manufacturers are hearing more and more about the successful results that follow when the McGraw-Hill Four Principles of Industrial Marketing are applied. They are interested in knowing if and how the Four Principles apply to their particular Industrial Marketing and Advertising problems.

The chart graphically shows ten simple steps that translate the Four Principles into practical, sound Industrial Selling policies and plans for any line of products designed for industrial consumption.

The help and data of the McGraw-Hill organization are fully and freely available to manufacturers and their advertising agents in either preliminary or advanced consideration of these Principles and their possibilities.

## New Book
## "Industrial Marketing at Work"

HOW different manufacturers have followed this step-by-step application of the Four Principles is revealed in a new book, "Industrial Marketing at Work," which will be off the press soon. If industry is your customer nationally, a McGraw-Hill representative will be glad to discuss this book and leave with you a complimentary copy. Direct your request to the nearest McGraw-Hill office.

*ELECTRICAL*

ELECTRICAL WORLD
ELECTRICAL WEST
ELECTRICAL MERCHANDISING

•

*CONSTRUCTION & CIVIL ENGINEERING*

ENGINEERING NEWS-RECORD
CONSTRUCTION METHODS

•

*INDUSTRIAL*

AMERICAN MACHINIST
INDUSTRIAL ENGINEER
CHEMICAL & METALLURGICAL ENGINEERING
POWER

•

*MINING*

ENGINEERING & MINING JOURNAL
COAL AGE

•

*TRANSPORTATION*

ELECTRIC RAILWAY JOURNAL
BUS TRANSPORTATION

•

*RADIO*

RADIO RETAILING

•

*OVERSEAS*

INGENIERIA INTERNACIONAL
AMERICAN MACHINIST
(EUROPEAN EDITION)

•

*CATALOGS AND DIRECTORIES*

ELECTRICAL TRADE CATALOG
ELECTRICAL ENGINEERING CATALOG
RADIO TRADE CATALOG
KEYSTONE COAL MINING CATALOG
KEYSTONE COAL BUYERS CATALOG
KEYSTONE METAL QUARRY CATALOG
CENTRAL STATION DIRECTORY
ELECTRIC RAILWAY DIRECTORY
COAL FIELD DIRECTORY
ANALYSIS OF METALLIC AND NON-METALLIC MINING, QUARRYING AND CEMENT INDUSTRIES

# McGRAW-HILL PUBLICATIONS

McGRAW-HILL PUBLISHING COMPANY, INC.

NEW YORK CHICAGO SAN FRANCISCO ST. LOUIS CLEVELAND PHILADELPHIA LONDON

# "Tool Steel" Gears Lead as Usual

The Southern Railway of England has had 356 American made gears in service for ten years. The accompanying illustrations show gears and pinions made by Tool Steel Gear and Pinion Co. of Cincinnati, Ohio after 595,000 miles.

It is significant to note that after an average of 595,000 miles per gear the maximum tooth wear was 0.008 inch and the majority showed only 0.002 inch to 0.005 inch wear.

These are the facts as brought out in a report by A. E. Roberts, Rolling Stock Engineer, Southern Railway, Wimbledon, England.

## American Gears and Pinions Found Satisfactory in English Operation

RESULTS obtained with American gears and pinions as maintained in British shops indicate that they hold up well as compared with the British product, according to an article in this issue by A. E. Roberts. Likewise his story is a good message to American maintenance men as showing the value of the great care used to maintain bearings and accurate centers between gears and pinions. In this way the gears and pinions always mesh on the original pitch line.

British engineers have long maintained that it was necessary to manufacture gear and pinion teeth to very accurate dimensions. Mr. Roberts rather reluctantly admits that even though he is a Britisher he finds that the ten years' experience with 356 American made gears on the Southern Railway of England has proved that despite the somewhat less accurate dimensions the American product has proved most satisfactory in service. The careful checking of gear and pinion centers every 100,000 miles insures good alignment and allows the surfaces to wear to accurate dimensions and to take on a very high polish along the pitch line.

*Both the article above and the one at the left appeared in the June 19, 1926 issue of* ELECTRIC RAILWAY JOURNAL.

*June 19, 1926* ELECTRIC RAILWA

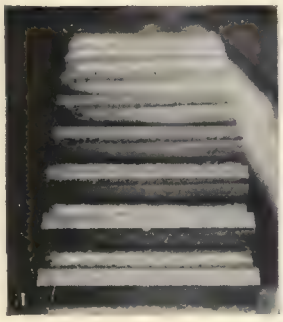
# High Standard of Bea Gives Long Gear Life

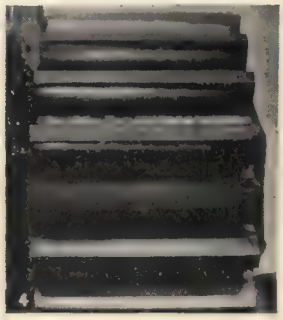
**After an Average Service of 595,000 Miles per Gear, the Maximum Tooth Wear Found Was 0.008 In. and the Majority Showed Wear Between 0.002 In. and 0.005 In. on Electrified Lines of the Southern Railway, England**

*By A. E. Roberts*
Rolling Stock Engineer Southern Railway, Wimbledon Park, England

able an
factured in

On the eastern se
sets of gears and pinio
been installed, and an inte
service obtained from these wi
in the future. These British gears are of high-grade steel and of such high tensile strength that only manufacturers with the highest class of gear-cutting machinery could generate the





Close-Up Views of American Gears and Pinions After Ten Years of Service
Figs 1 and 2 show gears and Figs 3 and 4 pinions after 595,000 miles

teeth. The pinions are of a lower grade of steel, cut, heat-treated and ground after treatment. They are extremely accurate in all respects, the teeth being within 0.001 in. and the cumulative errors over five teeth being not more than 0.002 in.

and seemed to have an endless life Conclusions indicate that while extreme accuracy may be desirable in gearing for stationary machinery, it is not necessary for electric railway work.

Some figures as to the service in which our gear-

Note! Since the above article was written an additional extension to the electrification was made and $72,000 more of "Tool Steel" gears and pinions have been ordered for new equipment.

# The Tool Steel Gear & Pinion Co.

Cincinnati, Ohio

# DREW Equipment for Electric Railways

**Drew Floating Bell Hanger**
Positively eliminates loose ears because of tight lock between hanger and ear. Prevents rusted and worn threads. Assures better service with a saving.

**No. 7520 Porcelain Strain Clevis**
Used in large quantities by leading railway companies for great variety of overhead work. Practical. Convenient. Ample insulation. Strong enough for any overhead work.

**Drew Spring Ear**
Does away with destructive wear on trolley. Eliminates pounding on trolley wheel, base, hangers, trough structure. Insures smoother and quieter car operation.

Drew Overhead Line Material is always of the latest approved type. Built to a standard that has made Drew Products *first* among railway men, you can be sure that every article will give many years of good, hard service. Easy and quick to install. Economical to buy.

Whatever you need for electrical railway maintenance and installation work, you can know that Drew will deliver what you want, where you want it—when you want it. Drew service is quick, prompt, satisfactory.

Drew Products assure better service with a saving.

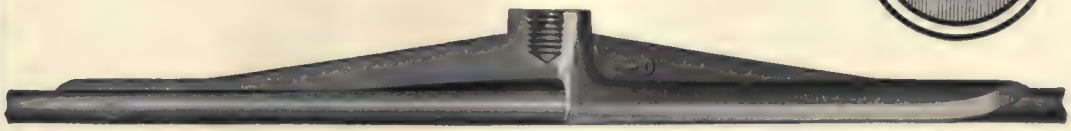
**Drew Safety Mirror**
Greatly reduces boarding and alighting accidents. Quickly adjustable for different types of cars. Gives motorman clear view of steps. Cuts running time because motorman can always be ready for instant starting.

MEMBER AERA

*Descriptive material and prices on request.*

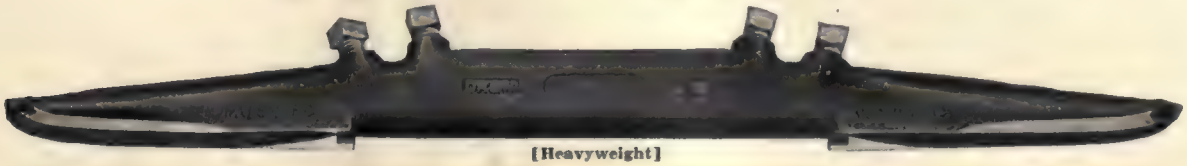
## The Drew Electric & Mfg. Co.
Cleveland, Ohio

DREW



**Drew Cushion Ear (Above).** The merit of this ear is best recognized from its performance in actual service. Repeat orders over a period of years from large and small properties prove the claims we make for Cushion Ears. Longer life and complete protection for the trolley wire.

**Type "L" Heavyweight or Type "R" (Lightweight) Splicing Ear or Splicer** actually becomes a part of the wire in use, giving smooth under-run for the life of the wire. V shaped approach carries the current collector on and off with minimum jar or vibration. Prevents notching or rough spots.



[Heavyweight]

JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

# Creosoted pine poles 30 years old haven't yet begun to fail

IT IS difficult to say how long creosoted southern yellow pine poles will last. Very few such pole lines have been in service long enough to determine ultimate life.

The Washington Norfolk line of the American Telephone and Telegraph Company, built of creosoted pine poles about 30 years ago, is still in "good as new condition."*

So few replacements are needed in this line on account of decay that the regular routine pole inspection is not made.

It is evident from examples like the above that the life of such poles is well over 30 years. The cost is very little more than for poles having greatly inferior life. Have you investigated the possibility of maintenance economy through the adoption of Amcreco Creosoted Pine Poles?

**AMERICAN CREOSOTING COMPANY**
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED

AMCRECO LOWRY PROCESS CREOSOTED WOOD

GEORGIA CREOSOTING COMPANY INCORPORATED

LOUISVILLE ~ KENTUCKY

*SALES OFFICES*

332 So. Michigan Ave. Chicago — 350 Madison Ave. New York City

Brunswick, Ga. — 401 W. Main St. Louisville, Ky. — Bogalusa, La.

**See report of Committee on Wood Preservation A. E. R. A. 1926, page 98.*

ERJ4-16-Gray

GERARD SWOPE

# BUSINESS PAPERS
## —*spokesmen for industry*

"THE interpretation of the ethics and ideals of business and industry to the public," said Gerard Swope, president of the General Electric Company, at the last Associated Business Papers Convention, "can have no better mouthpiece, can have no better spokesman, than the technical and business press."

This publication you hold in your hand is a business paper. The publisher and his editors and advertising men are a part of the industry which they serve intimately, acquainted with the technical, professional, or trade practices and methods of that industry, or business or vocation.

The editors pick out of the many phases of the flow of trade, news and policy trend in methods or machinery which will best serve the reader's needs. The advertising pages are a huge many-leaved coupon on the editorial section. And above all, the paper as a whole seeks to express the higher purposes and objectives of the small and large business men it serves.

For as Mr. Swope further said in his fine analysis of industry responsibility in this same address:

"It isn't necessary to be big to be successful, but it is absolutely essential to be successful to be big. You can't grow without that."

ABP

The A. B. P. is a non-profit organization whose members have pledged themselves to a working code of practice in which the interests of the men of American industry, trade and professions are placed first--a code demanding unbiased editorial pages, classified and verified paid subscribers, and honest advertising of dependable products.

*This publication is a member of*

THE ASSOCIATED BUSINESS PAPERS, INC.

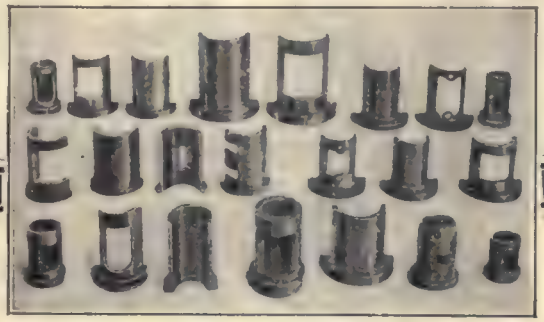
BUDA
ESTABLISHED
1881

For the Best in Track Work

Forty-five years experience and the best of modern facilities.

*Send Us Your Inquiries*

THE BUDA CO.
Harvey, Ill.



COLUMBIA BEARINGS

ARMATURE and axle bearings, motor bearings, compressor bearings and journal bearings—cast and machined to Columbia standards to assure long wear, perfect halves and complete interchangeability. We have patterns on hand for all standard railway motors and many bearings with special dimensions for rebored motors or returned shafts on axles. Our manufacture has been so standardized and simplified that you are also apt to find advantage in the price. May we quote you on your requirements ?

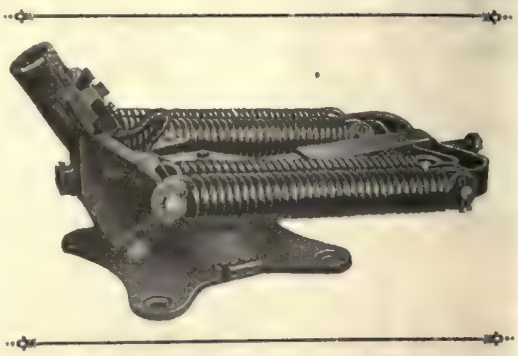
COLUMBIA 18 90 MACHINE WORKS

*Railway Equipment and Supplies*

Machine and Sheet Metal Work, Machinery, Grey Iron and Brass Castings, Patterns, Forgings, Armature and Field Coils.

The COLUMBIA MACHINE WORKS & M. I. CO.
265 Chestnut St., corner Atlantic Ave., Brooklyn, N. Y.

# Do You Think You Could Build a Nuttall Trolley?



You doubtless could if you knew what grade of metal to put in the foot, the swivel, the pole socket, etc.—if you knew where they had to be reinforced to withstand strains and where they had to be lightened to keep down weight; if you knew a reliable foundry that could furnish suitable castings; if you had $60,000 worth of special machinery, tools, jigs, reamers, drills, etc., but even so, if you didn't have 35 years of experience and a crew of skilled mechanics you couldn't *equal* a Nuttall Trolley. So why should you think anyone else could?

Why should you buy just trolley poles, trolley harps, trolley wheels? If they cost less than Nuttall's its poor economy anyhow because they are worth less. And it is worth something *more* to get with your purchase the feeling of confidence inspired by a product you know is *right*.

***Buy genuine Nuttall Trolley parts, poles, wheels, harps, from Nuttall.***

**R.D. NUTTALL COMPANY**
**PITTSBURGH PENNSYLVANIA**

MEMBER AERA 1927

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

# "HOFFMANN"

A HEAVY-DUTY precision roller bearing—the value of which must be measured by its mileage, not by its price—by which standard it is the most economical bearing for traction motors.

*Catalog* 904.

**NORMA-HOFFMANN BEARINGS CORPORATION**
Stamford — Connecticut
PRECISION BALL, ROLLER AND THRUST BEARINGS

N-19

## KUTHA

The Bhils believe that when a man dies of a mad dog bite his spirit returns for a half hour on the third day.

During that time he makes the wildest possible prophecies on what will happen to the tribe.

Brush buyers, that is buyers of hit-or-miss carbon brushes would get from this mad-dog spirit about the same words that they got from the salesman who prophesied results from such brushes.

Morganite Brushes, being sold on the saner principles of engineering prescription, are out of this cat&dog class.

They don't bite, bark, howl or growl on the commutator.

**Morganite Brush Co., Inc.**

*Main Office and Factory*
*3302-3320 Anable Ave., Long Island City, N. Y.*

DISTRICT ENGINEERS AND AGENTS

***Pittsburgh,*** Electrical Engineering & Mfg. Co., 909 Penn Ave.
***Cincinnati,*** Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.
***Cleveland,*** Electrical Engineering & Mfg. Co., 422 Union Building.
***Baltimore,*** O. T. Hall, Sales Engineer, 437-A Equitable Building.
***Revere, Mass.,*** J. F. Drummey, 75 Pleasant Street.
***Los Angeles,*** Electrical Engineering Sales Co., 502 Delta Building.
***San Francisco,*** Electrical Engineering Sales Co., 222 Underwood Building, 545 Market Street.
***Toronto, Can.,*** Railway & Power Engineering Corp., Ltd., 101 Eastern Ave.
***Montreal, Can.,*** Railway & Power Engineering Corp., Ltd., 326 Craig St., West.
***Winnipeg, Can.,*** Railway & Power Engineering Corp., Ltd., P. O. Box 325.

VIZABLEDG PATENTED
# SAFKAR
TRADE MARK REG
SAFSTEP

Step maintenance and replacement costs cease, when **"Safkar"** Steps are installed. All-steel, self-contained units, their non-slipping surface is an integral part of them, as lasting as the steel itself. The open mesh makes it a natural foot-scraper—car cleaning costs are reduced.

*Have you Bulletin D-28?*

**IRVING IRON WORKS CO.**
LONG ISLAND CITY, N.Y. U.S.A.
Established in 1902
SALES OFFICES IN ALL PRINCIPAL CITIES
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## STEEL CROSS TIES

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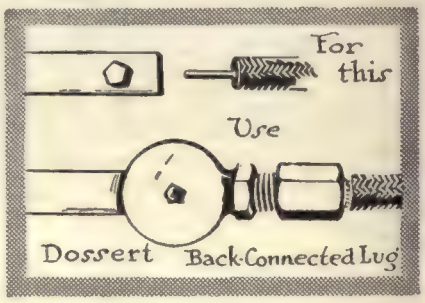


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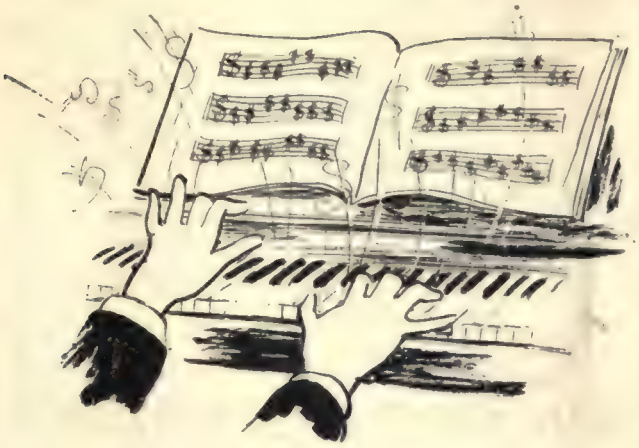

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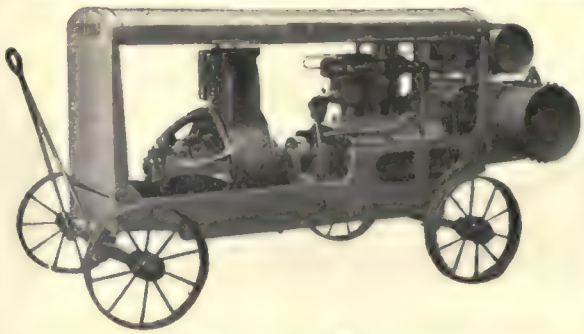

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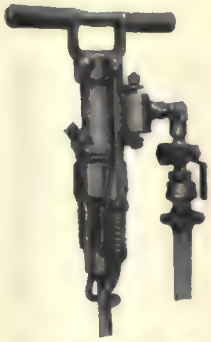

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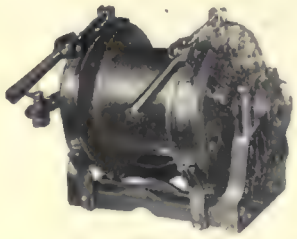

Turbinair Hoist
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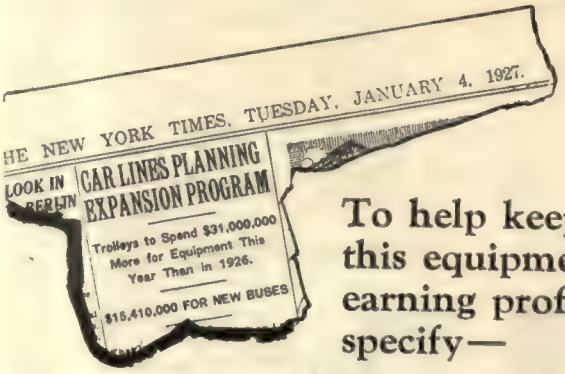


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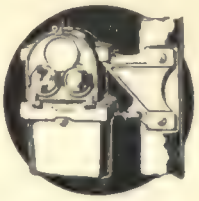

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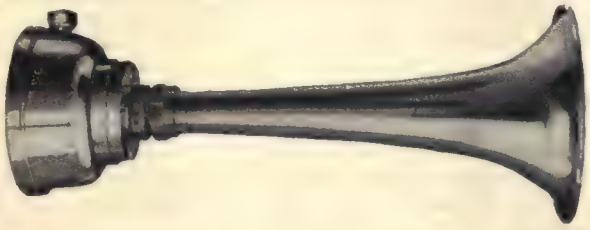

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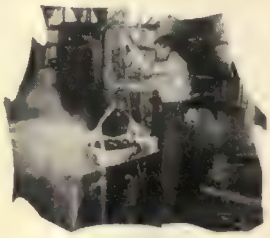

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Railway Trackwork Co.
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**Welding Steel**
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American Steel & Wire Co.
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**Wood Preservatives**
American Creosoting Co.

*Roanoke's new cars have platform automatic treadles perating rear exit doors in one-man operation.*

# Save and Ea

with

# Brill Moderı Cars

The possibilities offered by a type of car for both saving and earning determines whether or not it may be classed as a truly modern car. It must have a two-fold purpose. To win increased patronage, attractive appearance, riding comfort, convenience and efficiency and safety in operation must be taken into consideration. Durability in service, with low mtenance expense, must ɔ be considered, along h low power cost resultifrom light weight.

Brill Hern Cars are designedly after a careful analysif service requirements l are equipped in accoance therewith. That's y railways operating theoth save and earn at the sa time.

**THE J. G. BRILL COIANY**
PHILADELPHIA, P.

AMERICAN CAR CO. ST LOUIS MO. — G.C. KUHLMAN CAR CO CLEVELAND, OHIO. — ASON MANF'G CO. PRINCFIELD, MASS

# HASKELITE ROOFS

## *On the*
## Grand Rapids Railway Co.
### Grand Rapids, Michigan

27 cars built by St. Louis Car Company. PLYMETL side panels. HASKELITE roofs, headlinings and interior finish. This company now rebuilding ten cars using HASKELITE products. Note the letter from Mr. L. J. De Lamarter, Vice-President and General Manager.

***Ask for detailed blue print booklet***

HASKELITE MANUFACTURING CORPORATION
133 West Washington Street,
Chicago

***Railway Representatives:***

Economy Electric Devices Co.,
37 W. Van Buren St., Chicago

Grayson Bros.,
600 LaSalle Bldg., St. Louis, Mo.

George E. Watts,
1523 Candler Bldg., Atlanta, Ga.

Railway & Power Engineering Corp.,
Toronto, Ont., Canada.

GRAND RAPIDS RAILWAY COMPANY
GRAND RAPIDS, MICHIGAN

L. J. DELAMARTER
VICE PRESIDENT & GENL MGR

March 28th, 1927.

Haskelite Manufacturing Corp.
133 West Washington Street
Chicago, Illinois

Gentlemen:

Thinking possibly you may be interested in seeing them, we are sending you under separate cover a few pictures showing our new cars in service.

These new cars are the ones on which we used your products, HASKELITE and PLYMETL, and they are working out very satisfactorily. We have been watching them very carefully and are well pleased with them. We are not making any car purchases this year but assure you if we were doing so, we would specify your products in their construction.

Very truly yours,

LJD*G

L. J. DeLamarter

Vice-Pres. & Gen. Mgr.

# PLYMETL SIDE PANEL

w-Hill Publishing Company, Inc. April 23, 1927 Twenty Cents per Copy

# ELECTRIC RAILWAY JOURNAL

THE most recent emphasis upon the value of Timken Tapered Roller Bearings comes from their use in rolling stock. Here must be met all the thrust, shock and weight of flanged steel wheels speeding over steel rails, curves and switches. Timken Tapered Roller Bearings have qualified, with the same invincible endurance and other economies which make them standard in nearly every bus.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

TIMKEN *Tapered Roller* BEARINGS

# Every One Tested!

EVERY Westinghouse wood strain insulator is tested in this machine before being shipped.

The same thorough care is taken throughout their manufacture. The best second growth hickory goes into the wood section. End castings are swaged on at a precise angle—we have proved conclusively that but one angle will give maximum holding power. The stick will break before the end casting pulls off. And the holding power will not decrease through loosened end castings—carefully seasoning and impregnating the wood keeps all joints tight.

The test previously referred to and a close visual inspection form the final precaution to make sure that Westinghouse wood strains will keep your overhead lines up—and your financial overhead down.

Keeping the Overhead *Down* by Keeping it UP.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

MEMBER AERA 1927

# Westinghouse

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## Wood Strain Insulators

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*Vol.* 69
*No.* 17

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# *Mr. Manager,* You, Too, Are Interested

ATTENTION of electric railway managers is directed to the competition for maintenance men announced in the April 16 issue on pages 700-701 and this week on page 743. Fifteen cash prizes are offered for the best ideas which help to decrease costs, improve workmanship or avoid delays.

You, Mr. Manager, have an interest in this competition. Its purpose is to stimulate to greater interest in their work those charged with maintenance responsibility, and to promote interchange of ideas among maintenance men.

Departmental officers and employees are notably reticent in telling about their own accomplishments. A suggestion from the management will help to overcome this tendency. It will help to stimulate enthusiasm—and that is the first step toward improved performance. The JOURNAL is trying to do its part by offering these prizes. Encourage your men to enter the contest. Here is a topic to bring up at your next staff conference!

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SAVING THE RAIL SAVES THE RAILWAY—

# Makes light work of night work

Our grinders and welders are worked overtime on many a road. To help them do their best by night as well as day, we developed the

## "Ajax" Street Lighting Cluster

Now it's making light work of night work on all kinds of track and paving jobs. Reflectors universally adjustable independently. The upright telescopes and adjusts for height. All wiring enclosed. Terminal on base for attaching wire from trolley. 18-in. reflectors, 7 ft. 6 in. high extended, 5 ft. collapsed. Spreads 24 in. between reflector centers. Base diameter 24 in. Weighs about 100 lbs.

*Priced right*
*Shipped immediately*
*How Many?*

**Railway Track-work Co.**

3132-48 East Thompson Street, Philadelphia

AGENTS:
Chester F. Gailor, 30 Church St., New York
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Equipment & Engineering Co., London

736

SAVING THE RAIL SAVES THE RAILWAY—

# Only Marathon Ears Give Marathon Results

THAT NO other trolley ear approximates the length of service given by Marathons has been demonstrated not once, but many times, in comparative tests. In some instances Marathons have lasted more than three times as long as ordinary ears, under exactly the same operating conditions. 350,000 car passes and more is not at all unusual. And wire breaks have been reduced as much as 46 per cent on properties using Marathons.

Service tests, laboratory tests, and the long list of properties which have indicated their preference by repeat orders—all prove that only Marathon Ears give Marathon results.

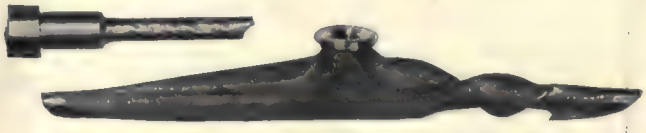
It's easy to figure what you would save in maintenance expense—not so easy, what you'd gain in better service. Either saving, however, makes it worth while to use Marathons on your property.

**Ohio Brass Company, Mansfield, Ohio**
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
343BR

## Chemical versus Physical Properties

It takes more than proper proportioning of copper, zinc, lead and tin to make a good ear. Though metal content is the same, physical tests reveal differences of as much as 15,000 lbs. per sq. in. in tensile strengths of metals made under different foundry conditions. Corresponding differences occur in ductility, hardness and other physical properties. Marathon Ears give better service because superior and uniform physical qualities are assured through O-B Technical Control at every step of manufacture.

Test Bar and Ear No. 1, shown above, were poured at the same time and of the same metal as that used in Test Bar and Ear No. 2, shown at right. But while the first test bar and ear were made in accordance with usual foundry practice, the second was made under rigid O-B Technical Control. As a result, the above bar and ear tested 15,000 lbs. less in tensile strength than Test Bar No. 2.



Test Bar and Ear No. 2, shown above, poured at the same time, of the same metal as No. 1, were made in accordance with standard O-B practice. Besides having greater tensile strength it showed 59 per cent greater elongation. In addition, Brinnel tests indicated an increase of 24 points in hardness over Test Bar No. 1.

# Ohio Brass Co.

SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES

PORCELAIN INSULATORS
LINE MATERIALS
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# Balanced Braking

## Double the Braking Area—

Double it—and you decrease over 50% the required energy absorption per brake shoe.

Double the braking area and you greatly increase the friction coefficient.

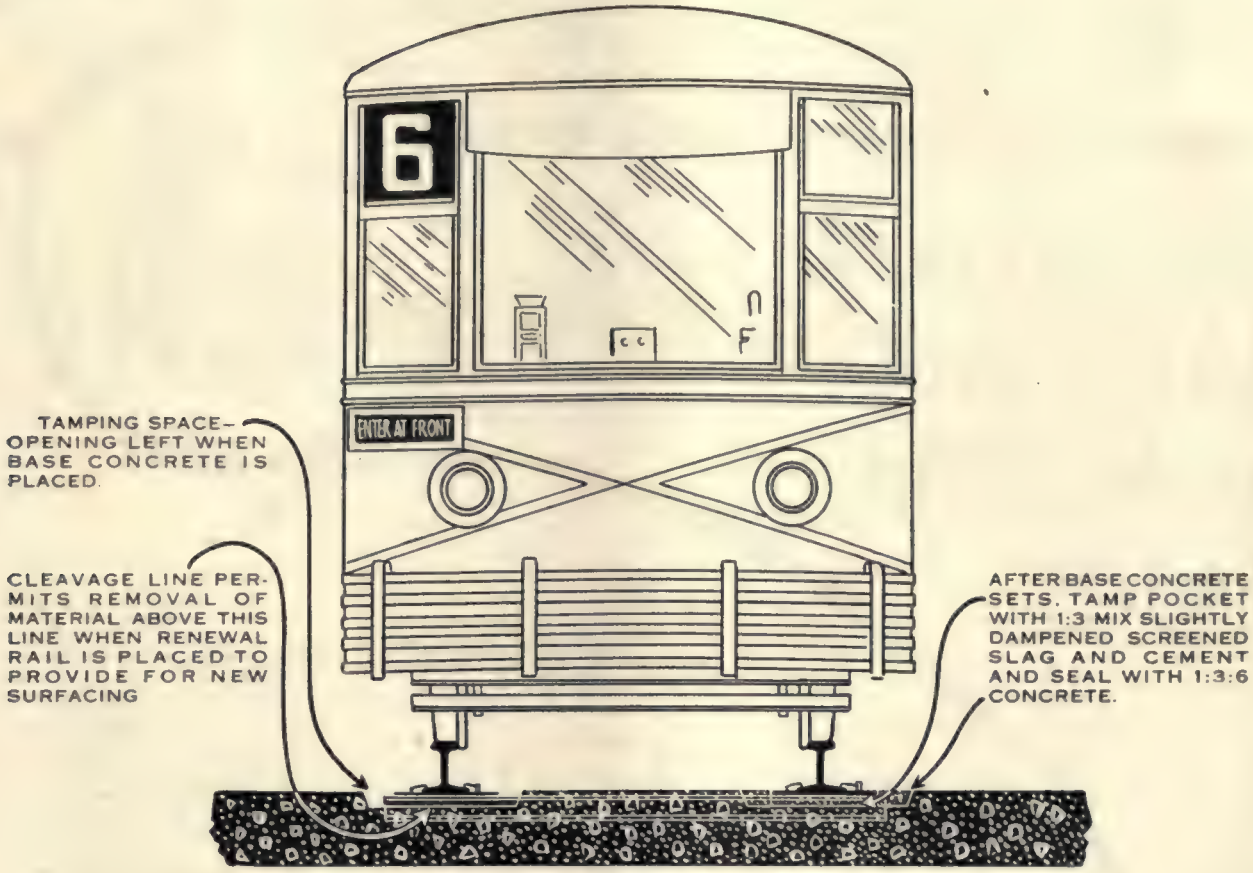
Double it and you can attain a higher rate of retardation.

Double it and you decrease the frequency of brake shoe replacements.

The "SIMPLEX AND AMERICAN MULTIPLE UNIT" clasp brakes with two brake shoes per wheel instead of one, doubles the braking area and accomplishes these results.

**AMERICAN STEEL FOUNDRIES**
NEW YORK CHICAGO ST. LOUIS

**American Multiple Unit Clasp Brake**




# Electric Rail Coaches on Renewable Track

THE necessary consideration of American buying psychology demands new and novel merchandise presented in a new and novel way.

So new track is required for your new cars —and the lowest cost construction of the longest life is available with the large spread bearing of Twin Tie construction in which the base is permanent and the track renewable at the end of its long life.

Use the delivered price on Twin Ties with the man-hour detailed estimate sheet which comes with the quotation to get a close estimate of this money-saving design under your local conditions.

*The* INTERNATIONAL STEEL TIE COMPANY, Cleveland, Ohio

Renewable Track? Rail Tilting? Rigidity? Flexibility? Noise? Old Concrete Base? Costs? Bearing? Construction Methods?

*Look it up in your "Paved Track Note Book"*

# Steel Twin Tie Track

Interlocking brakes and doors by means of the M-28 Brake Valve with selective control, increases safety and convenience.

# *How to make cars SAFE and make them SAVE*

MORE than 14,000 cars are now active demonstrations that operating safety is increased and operating expense is decreased when operating responsibility is centralized in one man whose duties are safeguarded and simplified by complete protective and labor-saving devices which interlock car-control, door-opening, and brake-manipulation functions.

Make *your* new cars safe, and make them save with the Safety Car Control Equipment.

We make the Safety Car Control Devices which make the Safety Car.

## SAFETY CAR DEVICES CO.

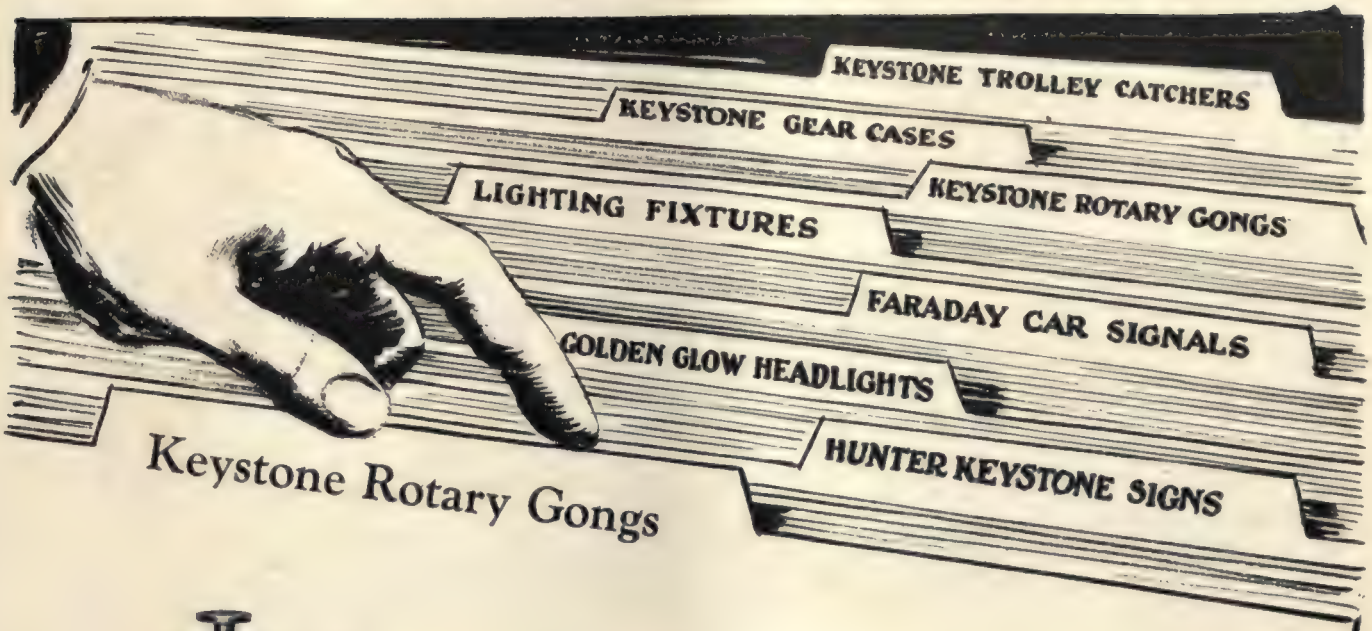
OF ST. LOUIS, MO.

*Postal and Telegraphic Address:*

**WILMERDING, PA.**

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

Interlocking the power and brakes by means of special controller handle provides safeguard against operator's inattention or disability.




# Keystone Rotary Gongs

To increase patronage, add attractiveness and efficiency to your cars by selecting your equipment from the broad line of Keystone Car Specialties.

## Keystone Rotary Gongs

Designed for giving at a slight pressure of the foot from one to fifteen strokes—regulated at the will of the operator. This loud and distinct alarm provides an effective warning in noisy surroundings. Such gongs are merely common-sense protection for equipment and passengers in these days of congested and noisy traffic.

*Ask for Catalog No. 7 to get full particulars of the complete line of Keystone Equipment.*

# ELECTRIC SERVICE SUPPLIES CO.

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# WESTINGHOUSE "VARIABLE LOAD" BRAKE

STABILIZED STOPABILITY throughout the entire range of car-loading means—

—safe and swift car movement, through congested districts;

—ability to hold traffic position with other moving vehicles, inasmuch as peak speed can be held longer between stops;

—a precise and systematic movement of shopping and business crowds;

—seconds saved, that may collectively be counted as dollars;

—stimulation of public good will, through a gratifying on schedule record over the entire system.

Many traction companies, recognizing the auspicious part Westinghouse Variable Load Brakes can play in effecting these far-reaching advantages, are specifying this new type equipment for their new modern light weight cars.

## gives Uniform Braking with Varying Load

Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office—

*Ask for Descriptive Catalogue T-2045.*

**Westinghouse Traction Brake Company**
General Offices and Works: Wilmerding, Pa.

# WESTINGHOUSE TRACTION BRAKES

# So strong—So safe!

**To obtain smoothness, reciprocating parts must be in balance—yet always interchangeable; light in weight—yet strong. Mack connecting rods are.**

Lightness in the reciprocating parts of a Mack engine contribute largely to efficiency—to smooth running. But with lightness there must be strength.

Mack steel tubular connecting rods combine the two. Lighter in weight for given strength. Uniform in weight because machined all over—inside and out. Uniformity makes all rods interchangeable; no grading necessary; engine balance always perfect.

Large diameter for stiffness prevents whipping. Extreme length in proportion to stroke reduces angularity and high pressure on sides of pistons and cylinders; repeated heat treatment during the process of machining assures uniform structure of steel and eliminates local stress. Ground shank portion eliminates tool marks and tendency to crack.

Lightness combined with strength. That's the Mack connecting rod.

The Northland Transportation Company, Subsidiary of the Great Northern Railroad, uses Mack Buses on the most severe routes of the Northwest

# To Satisfy Engineers—

**Railroads buy carefully. For years they have been famed for painstaking care in the selection of their purchases. They employ men of experience to carefully check each item they buy. And in mechanical equipment particularly, they have a staff of engineers who select only when they are sure that their demands for performance, dependability, and economy can be met.**

**An operation such as the Northland Transportation Company must be particular in the selection of buses. They operate routes 250 miles in length thru unpopulated territory, mountains of snow and temperatures 33 degrees below zero. Human life depends on dependable equipment—so they select Macks.**

**Dependability such as they demand can result only from the use of the finest materials—refined by peerless engineers and painstaking manufacturing.**

**For example—the Mack connecting rod is one of the refinements—light, rugged, balanced—that the Northland Construction Company appreciates.**

**Mack Ruggedness insures dependability**

## Mack Trucks, Inc.

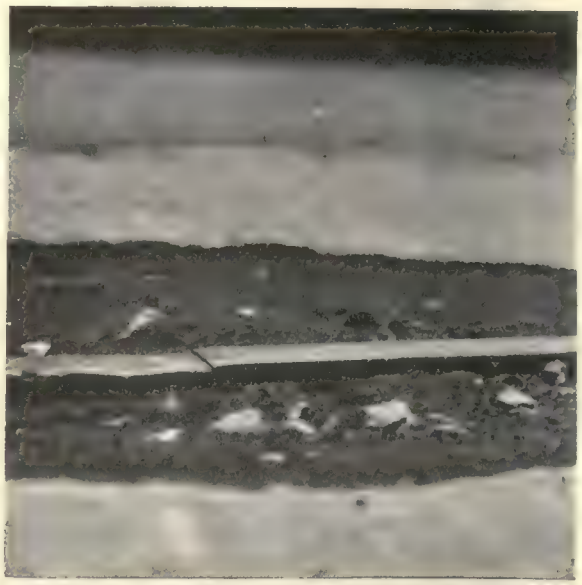
**International Motor Company**

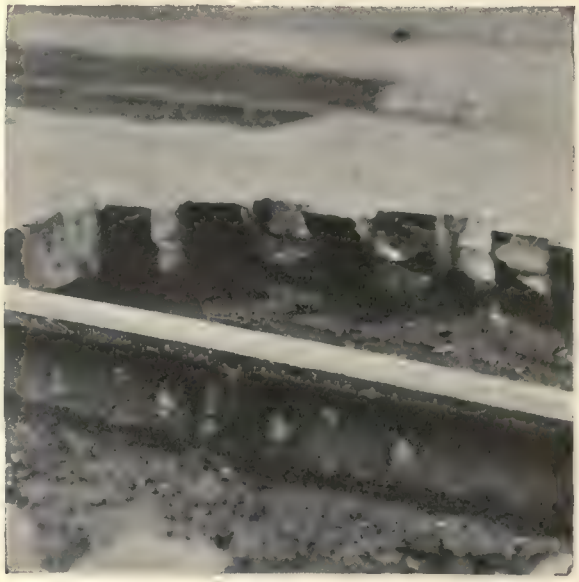
**25 Broadway, New York City**

# Ask us another!

1. What is a modern car?
2. Is efficient door and step control essential in this car?
3. How can door and step equipment increase earnings?
4. Does this equipment increase safety?
5. How does efficient door and step control help to increase speeds?
6. How can this equipment increase comfort?
7. How does efficient door and step control contribute toward courteous treatment of passengers?
8. What is the circulating load and what problem does it solve?
9. How can the circulating load be operated with only one man in charge?
10. Can large as well as small cars be operated in this way?

*See answers to these questions on page 27.*





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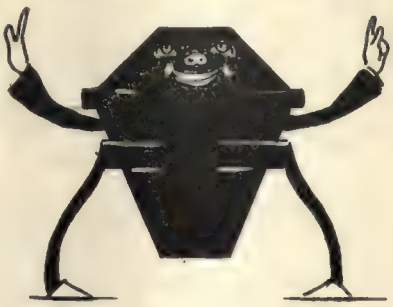


—After—

# Don't patch it— Thermit weld it!

In 1919 the street car tracks of the Indiana Service Corporation in Fort Wayne had a lot of joints like the upper left illustration. Rail ends were cupped. Angle bars were worn and bent. Paving was in bad shape at these joints.

Patching it up would have been the cheapest thing to do. Renewing the entire track would have been the most expensive. The former would have been poor economy, because patched joints would deteriorate again in a few months. The second alternative, rebuilding, would have soon been necessary even if the joints were repaired.

Fort Wayne did the truly economical thing—and Thermit-welded these joints at a cost of only $500-$700 per mile more than the patching would have cost. The upper right illustration shows the same joint after welding. Today, eight years later, this old track is still good, with the Thermit-welded rails as smooth and unbroken as when they were installed. Incidentally, the paving stands up, too. This track is on Calhoun St., Fort Wayne, and is subject to heavy interurban traffic, as well as regular city service.

**If old track is worth repairing at all, it's worth Thermit-welding.**

THERMIT

THERMIT

**METAL & THERMIT CORPORATION**

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

# CURVED SIDE Construction

## A *space-saving Comfort-promoting feature of* BALANCED DESIGN

Curved Side Construction has done three things for Cincinnati NEW Cars.

It has lent an attractive and "speedy" line to their external appearance.

It has permitted approximately *seven and one-half* inches additional space for seats and aisles, with ample roof and body clearance to meet all operating conditions.

And it has resulted in greater lateral stiffness, which, with the "stretch" incidental to curving of the side sheet material, results in permanently smooth, wave-free panels.

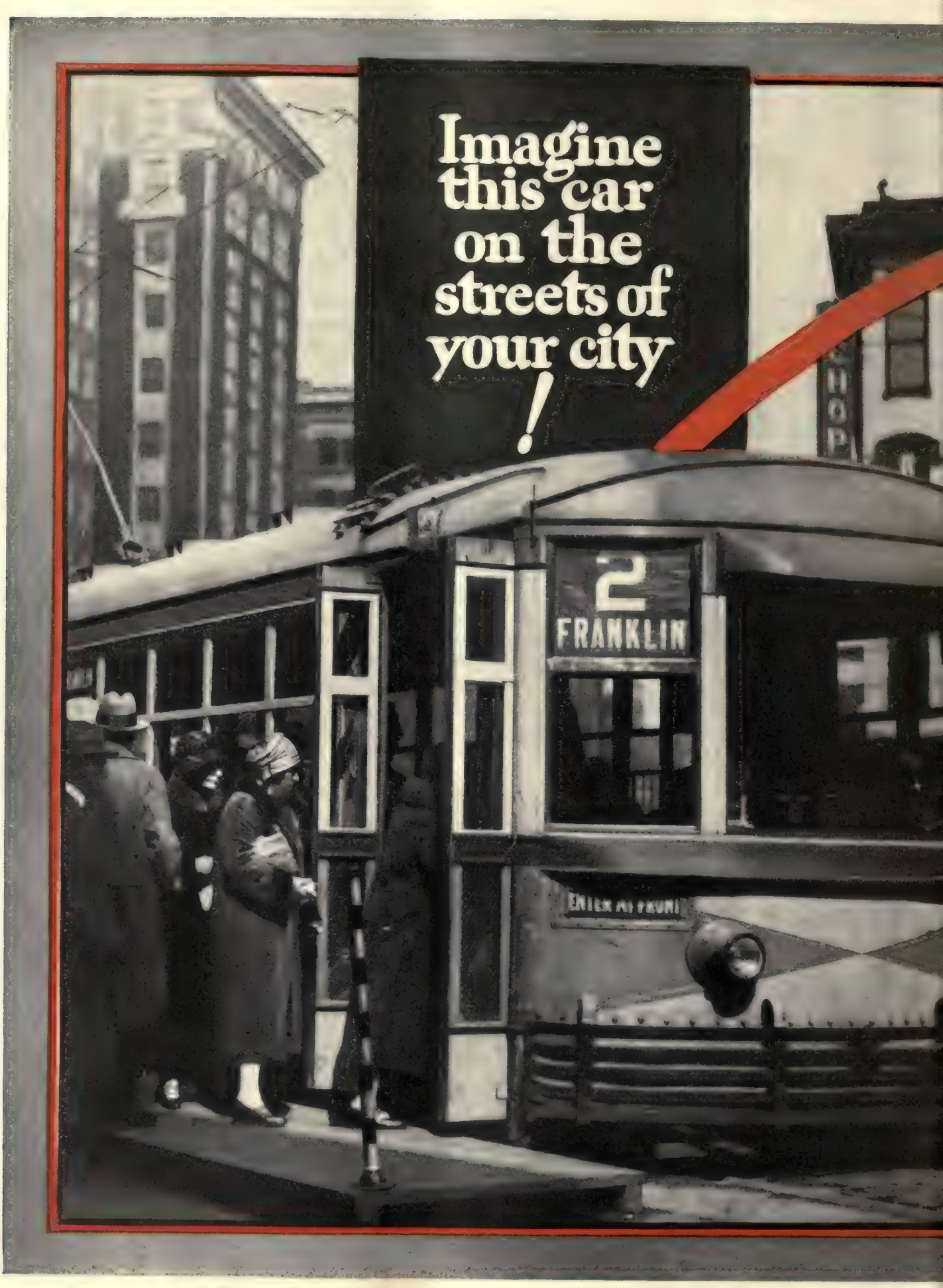
When you order your NEW cars, built to the Cincinnati principle of BALANCED DESIGN, you gain the advantages of many such new and valuable features of construction, *each accurately balanced in its relation to the whole for a definite service requirement.*

We will gladly explain in greater detail to any interested electric railway executive.

CINCINNATI CAR COMPANY
Cincinnati, Ohio

CINCINNATI *New* CARS

*A step ahead of the modern trend*


Imagine this car on the streets of your city!
2
FRANKLIN
ENTER AT FRONT

# Here's what happened with St. Louis cars in Grand Rapids

With revenue decreasing and operating costs mounting, if ever a property needed help Grand Rapids surely did. But by the use of modern equipment Grand Rapids helped itself! By the purchase of 27 new, modern light-weight St. Louis cars the trend of traffic, operating costs and public opinion was immediately reversed in favor of the railway.

The Grand Rapids Railway operating in a city of 150,000—is the type of property which has suffered most from automobile competition. But with the advent of its new St. Louis cars, revenue immediately increased; platform, power and maintenance costs decreased, trainmen took pride in the performance of their cars and are improving their relations with car riders. From the Mayor to the news boy, every citizen of Grand Rapids became a booster. These cars attracted patronage and the cooperation of the press. Goodwill was re-established on a mutual basis.

Did the investment in new cars pay? Were it not for the fact that similar results are being obtained in many other cities by St. Louis Quality Cars, what happened in Grand Rapids would seem phenominal.

**Grand Rapids Railway Company**

The Grand Rapids Railway Company reports for 1926 gross earnings of $1,776,758 as compared with $1,738,779 in 1925, while net earnings were $521,761, against $422,499 in the previous year. After deduction for interest and all other fixed charges for the year 1926 there remained a balance of $185,059 available for dividends and retirement reserve, which is equivalent to $9.25 a share on the outstanding 20,000 shares preferred stock, as compared with $4.92 in 1925. After provision for retirement reserve earnings amount to $9,929, or 50 cents a share, as compared with a deficit of $67,542 in the previous year.

*built by*

**St. Louis Car Co.**

Quality Cars

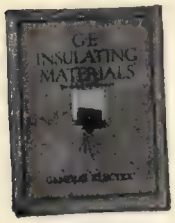
# Varnish Treated Cloth *weather the storms*

Electrical surges or poor operating conditions prove the economy of G-E Varnish Treated Cloths and Tapes. They withstand punishment. They protect your motors—keep them out of the shop—and they lower maintenance costs.

Their excellence begins with an acid free mechanically strong base cloth—*no starch filling*. This is literally soaked in G-E Varnish until every fiber is impregnated and cloth and varnish are one homogeneous material. The result is a high insulation value for *continued* service.

G-E Varnish Treated Cloths and tapes were developed in G-E Laboratories to insulate General Electric apparatus. They are used in G-E Railway Motors. You can buy lower priced treated cloths and tapes, but real economy—first cost plus period of service—dictates General Electric.

IN THIS CATALOG

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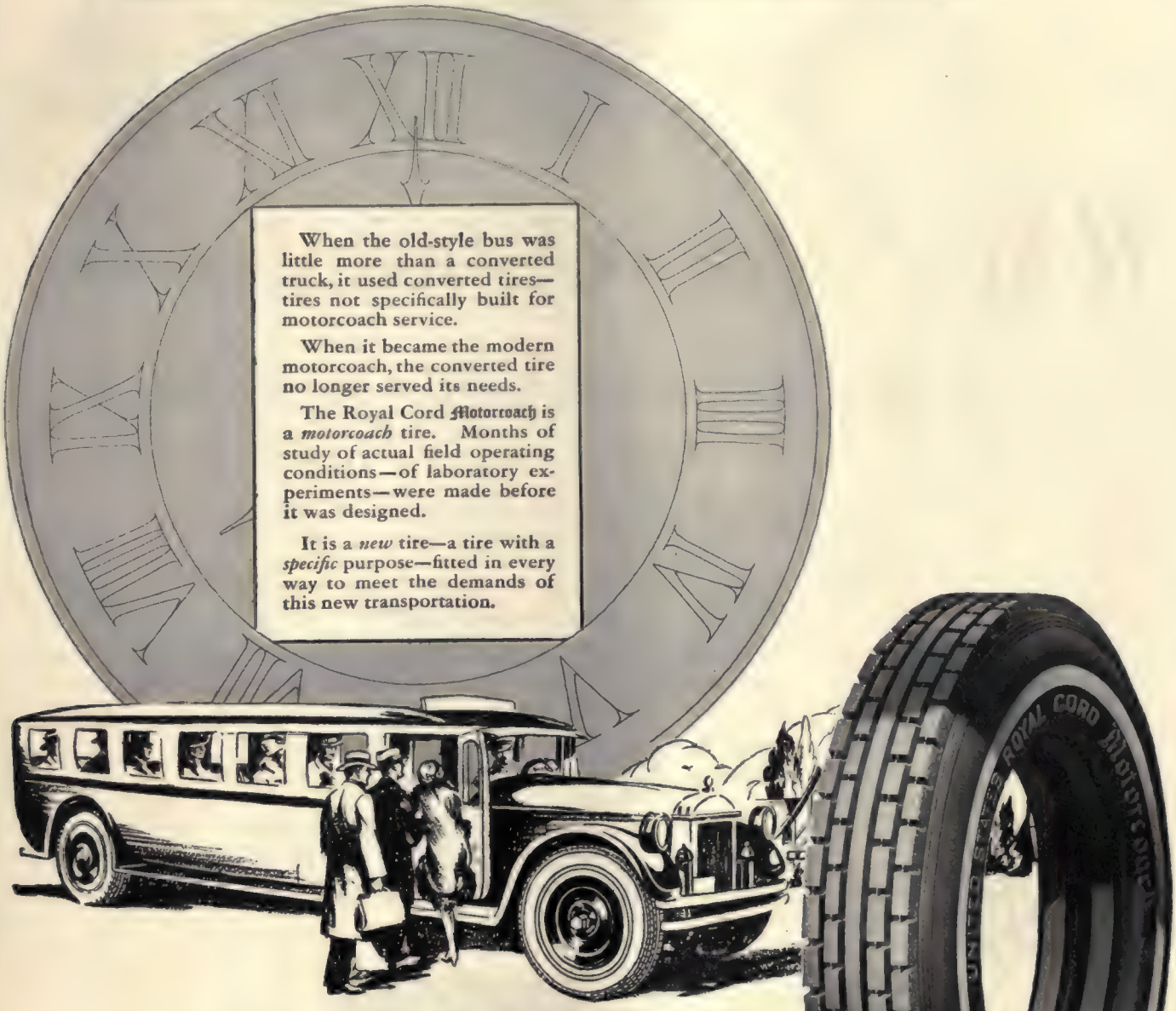
In materials, in design and in construction the Royal Cord Motorcoach Tire is made specifically to meet motorcoach requirements—to minimize tire trouble—to maintain up-to-the-minute schedules—to stand up on the roughest type of road—to operate at the "lowest cost per tire mile."

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**United States Rubber Company**

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UNITED STATES

# ROYAL CORD Motorcoach

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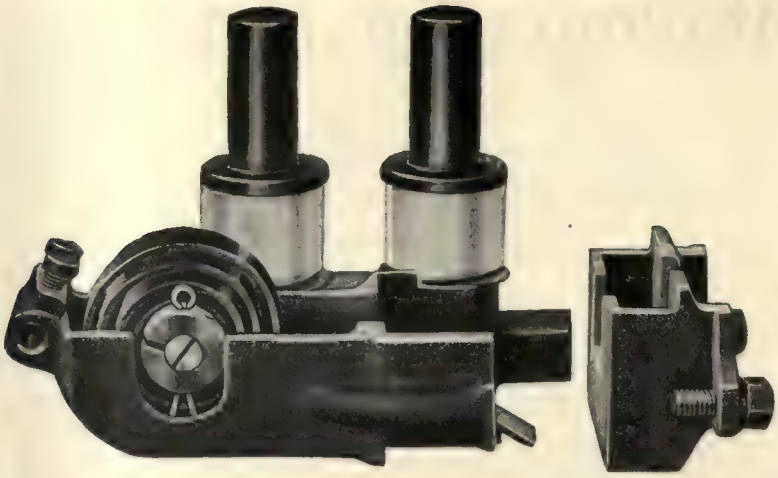

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# GENERAL ELECTRIC

# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

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## History Was Made in Springfield, Mass. Last Week

SUCCESSFUL demonstration of the experimental worm-drive car built under the auspices of the Springfield Street Railway, Springfield, Mass., which was reported in last week's issue, has created a great deal of discussion among electric railway men. Many are enthusiastic regarding the possibilities of this new design. Others are frankly skeptical. Between these two groups lies the great majority of the industry, whose attitude may be properly described as one of watchful interest.

The performance of the experimental car exceeded every reasonable expectation. In judging the results of the demonstration account must be taken of the radical changes which were made from conventional design practice. These included not only the truck, axles and brakes but also many features of the control and miscellaneous devices on the car. Even the lines of the body were radically changed from customary practice. All of these factors must be considered in judging the significance of the Springfield demonstration.

The new car accelerated smoothly and rapidly. The automotive type brakes, with diaphragms mounted on the axles and with internal expanding shoes in brake drums bolted to the wheels, performed efficiently and entirely without noise. The spring suspension cradled the body nicely against rough track and low joints. Over special work the familiar clank and rattle was replaced by a not unpleasant metallic click.

From the standpoint of noise reduction, the car did not seem to live up entirely to what had been anticipated for this design. This was true particularly on the interior of the car. While there was a distinct reduction of street noise to a pedestrian on the adjacent sidewalk, there was a hum on the interior which increased in intensity as the car picked up speed.

Even in this respect, however, there seems little cause for disappointment on the part of those responsible for the new car. It must be remembered that the wheels were solid steel, with no deadening pads of rubber or other noise-absorbing material. A special deep-dished plate section was used to bring the tread under the axle bearings, and this had the effect of making the wheel into a bell rolling on its edge. The sound of the flange rubbing in the rail groove was consequently amplified. Furthermore, the motors used were an adaptation of vehicle motors. They were wound for 300 volts and permanently connected in series for operation on trolley voltage. Some of those present during the demonstration were inclined to attribute part of the hum to the motors. If that is so, further development may be expected to show considerable improvement.

Some of those who are inclined to be skeptical regarding the possibilities of the worm-drive car contend that there has been no actual reduction in unsprung weight in comparison with modern types of conventional truck and motor assemblies. Here again it is important that premature judgment be withheld. It is to be expected that the axle manufacturer played safe in these first experimental equipments. In addition, the axles used are a direct application of heavy automotive vehicle practice. As the requirements for street railway conditions are better understood further refinement of the design may reasonably be expected. There is also another type of shaft-drive construction for street cars which is still untried in this country under modern conditions. That is the use of bevel-gear drive instead of a worm. Whether bevel-gear construction would have any advantages in weight reduction over the worm is hard to determine at this early stage in development.

Will the new type of construction stand up under the severe conditions encountered in street car operation? Nobody knows. Will the maintenance of worm-drive axles, roller bearings and differentials prove excessive in comparison with conventional truck construction? Nobody knows. But the industry does know that a design which materially reduces noise, which may be developed to decrease the pounding on expensive special work and joints and which gives the passenger a smooth and comfortable ride is very much to be desired if it will stand up in service. It is safe to say that equipment maintenance could be permitted to increase considerably if it resulted in decreased track maintenance. It would be a good investment if the change helped to eliminate from the public mind the idea that the electric railway is obsolete and on the way out.

The Springfield Street Railway is entitled to a great deal of credit for taking the brunt of responsibility in pioneering an improved type car. It is perhaps a reflection on the industry as a whole that the men on this comparatively small property, while going through the throes of a change in ownership, had the courage to spend good money in developing a car which they felt was needed. The benefit to be derived by Springfield is small in comparison to the possibilities which are opened up to the rest of the industry—both manufacturers and operators. Regardless of the final verdict on this first shaft-drive car, electric railway history was made in Springfield last week. The men who backed their convictions with courage to go ahead are entitled to frank commendation by every one who has faith in the electric railway industry.

## Get Out the Broom and Dust Cloth

EVERYWHERE over this broad land of ours windows are being raised; blankets are being hung on wash lines; every room in the house is topsy-turvy; the male members of the household are told that they are in the way; their favorite pipes must be excavated from the ash barrel. In short, en masse the housewives of the nation are engaged in spring cleaning.

As the women generally are the most practical of the human race, we should follow their example, bearing in mind that around May 1 the industry usually indulges in clean-up week. It is a fearsome job. The long winter months seem to take a malicious delight in making unsightly every nook and cranny of shops, office buildings, stations, street cars and carhouses. Winter's greatest ally in this respect is the heating plant, whose function seems to be airily to deposit soot and grime on windows, curtains, in bins and corners. The principal assistant of the heating plant is cold weather, which continually urges man to hibernate.

The clinging snow has stopped the scythe and grub hook that ordinarily we would employ on the right-of-way. Sleet and rain have washed off last summer's paint. Slush has left its mark on the underframes of our rolling stock. The winds of November and March have made leaf storehouses of our interurban stations. In the corners of our cars, especially near the sand containers, the reverend dirt lays down the gauntlet of battle. The cars may have been cleaned each day, but we must remember they were cleaned in a cold carhouse.

But what's the use of arguing when our duty is plainly laid out for us? Nature is cleaning up. Man is coming forth attired in new raiment. The home is feeling the merciless swish of brush and dust cloth. So it's plainly our duty to get out the brush and dust cloth, soap and water bucket, grub hooks and pruning knife. Roll up your sleeves and get to it.

## Relief of Traffic Congestion Demands Action, Not Words

REALIZATION of the seriousness of the transportation problem in our large cities is brought home by the address of J. Rowland Bibbins before the Chicago traffic meeting, published in this issue. Unless there is co-ordination of all forms of local transport so as to obtain the greatest good for the greatest number, all of the residents are bound to suffer, and suffer greatly.

Mr. Bibbins points out that the use of streets indiscriminately for all classes of traffic can lead only to confusion. It is not generally known that freight traffic is being carried on city streets to so great an extent as seriously to hamper the movements of passenger vehicles, but those who have given the matter careful consideration are aware that this is so. Then, too, use of the streets for loading and unloading these same freight vehicles reduces the capacity of the streets for those moving to a great degree. Add to this the parking of passenger vehicles, and it is small wonder that free circulation of vehicles is next to impossible.

Heed should be given to the conclusion that it is not enough to plan for the future. It will take years and millions of dollars to carry through projects involving extensive street widening, double-decking, subway construction and the like. In the meanwhile every effort should be made to get maximum use of the existing streets, which Mr. Bibbins has found out are by actual count often carrying only from 25 to 50 per cent of their possible capacity. While there are several alternatives to the proposals for increasing street capacity presented in the article, it will be necessary to make some decisions in the immediate future and to carry them through, for every day of delay adds its quota to the congestion and makes the solution of the problem that much more difficult.

## Corporate Readjustment Favorable to Future Financing

THINGS are happening in the electric railway financial world. This the record of events shows. Even considered singly they are significant, but a week's news that spreads on the pages of history the details of the voluntary readjustment of the financial structure of the Grand Rapids Railway, refunding operations in Denver and Cincinnati and the new Boston issue surely contains particulars worth pondering.

The railway at Grand Rapids helped materially to blaze the way in new things mechanical with new cars and in its efforts more intensively to sell transportation. Now it has come to the front again with a scheme for strengthening its financial structure. Financial papers refer to the plan as a reorganization. That is hardly the correct designation. It is a voluntary readjustment, the details have been given in the JOURNAL, whereas the term reorganization connotes something that is not voluntary.

It is the philosophy behind this move rather than the details that is of interest to the reader. The readjustment is dictated because of the large floating indebtedness of the company and the lack of a medium for doing any financing other than by the sale of first mortgage bonds. The feeling is that in view of the company's present condition, bonds cannot be issued in sufficient amount or be sold at advantageous prices.

The cause of the present floating indebtedness dates back to June 1, 1919, when $3,700,000 three-year bonds became due. These bonds were intended to refund long term 5 per cent bonds issued in 1900. The net increase in the debt of the company junior to the first mortgage bonds is $1,446,199, represented by $700,000 of 7 per cent gold debentures, $198,045 of car trust notes, $69,977 in increased amount of paving assessments not due, $58,218 of increased accounts payable, $245,458 of advances payable and $174,500 of bank loans.

The payments on the first mortgage bonds and on the car trust notes constitute cash requirements of about $178,000 a year. This is contrasted with payments of $140,000 under the plan of readjustment. Not only that, but it is anticipated the consummation of the plan will enable the company again to sell its first mortgage bonds at prices more nearly approaching par. In fact, an agreement for the sale of $200,000 of the first mortgage bonds has been made contingent upon the readjustment plan being declared operative. The sale of preferred stock locally may even be in prospect based in part on the results of the readjustment and the fact that for the twelve months ended Feb. 28, 1926, the gross income of the company increased $97,263, attributed largely to the reduction in operating expenses resulting from the use of the new Grand Rapids type of one-man rail coaches placed in service on June 30, 1926.

## Conditions in Money Market Have Made Refunding Easy

IT IS not such a far cry from the readjustment in Grand Rapids to the sale by the Boston Elevated Railway of ten-year 5 per cent bonds at 103¾ and interest to yield 4.90 per cent and the sale by the Cincinnati Street Railway of 5½ per cent first mortgage gold bonds at 100 and accrued interest to yield 5½ per cent. It might be objected that both of these companies are operating under terms and conditions unduly favorable to them. This is, of course, in part the explanation for the ability of these railways to finance at the favorable prices at which these securities are being marketed, but the entire explanation is not to be found in these operating contracts. Neither is the explanation for the favorable financing to be found in the steady rise of bond prices. That tendency, however, is propitious for all borrowers with a balance sheet that will withstand the scrutiny of the bankers. Of particular interest, however, is the feeling that bond prices generally are likely to continue at high levels for some time to come. This is forecast not only by the U. S. Treasury operations but by comparatively easy money, large and steadily mounting gold reserves with a downward trend in commodity prices. It does not appear to be going too far to predict that as bond prices continue to advance investors will more and more turn to the better grade of electric railway securities for yields which they feel their funds should command. And in that event companies like the ones in Cincinnati, Boston and Grand Rapids, to mention just a few that have set their houses in order, will be in the best condition to borrow at favorable rates.

## Cast Thy Bread Upon the Waters— It May Return Next Day

RECENTLY the local superintendent was taking a visitor over the routes to show how nicely his trolley and motor-bus services were being dovetailed. The outermost part of the area had been reached, possibly a half mile or more from a house, when a limousine was seen careened in the roadside ditch. Promptly he stopped his own car at the scene of the trouble and found that the chauffeur and woman rider were in a dilemma regarding what to do next. The lady did not care to be left alone on the open road while the chauffeur trudged for help. On the other hand, neither car carried towing equipment strong enough to drag the limousine out of the ditch.

The superintendent was equal to the occasion. He told the lady that he would hustle back to town at once and send his company's wrecking car to her aid with the compliments of the management. So promised, so done. The visitor ventured to praise him for his courtesy, but he said it was all in the day's work. It was bread cast upon the waters, to return, perhaps, after many days.

"Came dawn and a new day," as they say in the movies. With the day came the postman and with the postman a letter in fashionable, feminine hand. It was from the lady whose car had been retrieved from the ditch. And who was she? None other than a relative of one of the most influential men of the town. She had made no secret of the fact that her friendly Samaritan was the chief of the local transportation concern and was satisfied that the corporation he represented must be a human and worthy one. Of such is the Kingdom of Good Public Relations.

## Tax Burdens for Our Stepbrothers and Possibly Us

OUT in Ohio the tax leviers are at it again. As usual, their prey is the public utilities. The upper branch of the Ohio Legislature has passed a bill to increase the excise tax on intrastate gross receipts of several of the public utilities from 1.2 per cent to 1.5 per cent on the dollar. Action by the House is expected soon.

Here is what the measure means to certain public utilities in the Buckeye State, according to a recent speech made by Senator Atlee Pomerene before the committee on taxation of the Ohio body:

"It is estimated that their gross receipts (water, gas, heating, telephone and electric light utilities, etc.) for the coming year will be about 7.6 per cent in excess of what they were last year. For the year 1930, carrying out these estimates of increase in accordance with the general increase during the past several years, it will be found that under the 1.2 per cent levy the increase in state revenue from this source will be about 93.5 per cent. And for 1935, assuming that the utilities' rate of growth during the past ten years is continued during the next ten years, the sum of money which the utilities must pay into the state treasury under the 1.2 levy will be increased 423.5 per cent. If the proposed 25 per cent increase in the excise tax be imposed by raising the rate from 1.2 to 1.5 cents on the dollar, the present year's increase in money which the utilities would have to pay in excise tax would amount to 34.5 per cent over last year. In 1930 the increase would be 141.9 per cent, and in 1935 it would be 554.5.

All of which, summed up, resolves itself into the fact that if the 1.5 per cent rate becomes effective, the utilities, which in 1925 under the present rate paid $2,413,000 in round figures, will pay to the tune of $15,797,000 for 1935.

Bearing these figures in mind, there are found, in addition, the following interesting sidelights:

1. While the increase in the total state tax valuation (1910-1925) was 410 per cent and on all utilities amounted to 481 per cent, the increase on electric light and power, gas and telephone industries amounted to 807 per cent.

2. The total value of credit in round numbers included mortgages, accounts receivable, notes, bonds, etc., listed for taxation in the entire state for 1924 was only $366,000,000; money on deposit and listed for taxation totaled $269,000,000, whereas an examination of the bank statement reveals that the total amount of money on deposit throughout the state was about ten times that amount.

3. The total tax, state, local and federal, paid by electric light and power, gas and electric railway companies in Ohio has increased 31.06 per cent in six years.

4. The funded debt of the Ohio counties and other political subdivisions has increased 385 per cent since 1910.

Is it necessary to go any further? Are we not presented with the old pussyfooting practices of making the other fellow pay; with burdening the ultimate consumer with the hocus-pocus of robbing Peter to pay Paul? And lastly, another orgy of bad issues, which are not backed by solid financial practice.

What is apparently in store in the way of further burdens by our stepbrothers may be imposed on us at any minute. Because the electric railway field is not the sufferer it is no reason to relax our vigilance.

Passengers entering one of the five new cars recently delivered to the Williamsport Passenger Railway from the Philadelphia works of the J. G. Brill Company. The group shown in the picture is the Citizens' Traction Committee of Williamsport, inspecting the cars before they were placed in service.

# Williamsport Rehabilitates Following Citizens' Recommendations

**Attractive new cars are provided in Pennsylvania city, following constructive report by citizens' committee and co-operative attitude between city and railway. Extensive rehabilitation program undertaken. Company given increased fare and relief from paving**

FOLLOWING several months of intensive study, the traction investigation committee, a group of representative citizens appointed by the Mayor of Williamsport, Pa., some time ago found that the transportation situation in the city needed not only an improvement of the physical properties but an improvement of the laws that govern the corporation. The committee was equally as frank in recommending one as the other.

So pertinent were the recommendations that immediate action was obtained. Shortly after the report was submitted, the city removed the obligation to pave within the track areas. The company has also started an extensive rehabilitation program requiring large immediate expenditures. This includes the erection of a new carhouse, the purchase of new cars, the rehabilitation of several other cars and extensive reconstruction of certain tracks.

The four underlying railway companies have been consolidated into the new Williamsport Railways Company in compliance with one of the recommendations. The fare increase recommended was held up voluntarily by the company until its share of the program was well under way. Application was filed with the Public Service Commission for the increase. This was granted and went into effect on March 1, 1927.

Upon completion of the new carhouse and shop an "open house" was held on Jan. 22, 1927. More than 2,000 citizens visited the new shops of the company and employees explained the many features of the building and officers told of the change that has taken place in the entire transportation situation of Williamsport. In the evening a dinner was given by General Manager L. W. Heath to presidents and other officers of the various local clubs and associations of the city. The work of the traction investigation committee was reviewed and a report of the progress made during the first year was presented.

### The Committee's Findings

Six representative business men were appointed by the Mayor of Williamsport in July, 1925, to investigate the traction situation. The committee was formed at the request of the four operating companies that such a body be appointed to investigate, advise and if possible to offer some solution of the problem that would permit the continuance of the service so that they could earn a fair profit.

The findings of the committee herewith presented in abstract are of interest in that they show a comprehensive understanding of the situation.

Tracks in certain sections of the city were found in excellent condition, but in others they were in such poor condition that it was held they should be immediately replaced. The carhouse on West Fourth Street was found to be inadequate and in bad physical condition. Construction of a new carhouse was recommended.

Of the 37 cars owned, some were of a type that could

The exterior of one of the 32 cars rehabilitated in Williamsport. Dash floodlighting is in conformity with the new cars recently purchased

be rebuilt and modernized. Five of the old cars were in very poor condition and it was recommended that they be scrapped and written off. Others were good only for extra service and could not be economically operated on regular schedules. The committee also found that the major portion of the trolley wire and feeder system was in good condition.

Largely due to automobile competition, the number of riders has decreased steadily during the last five years.

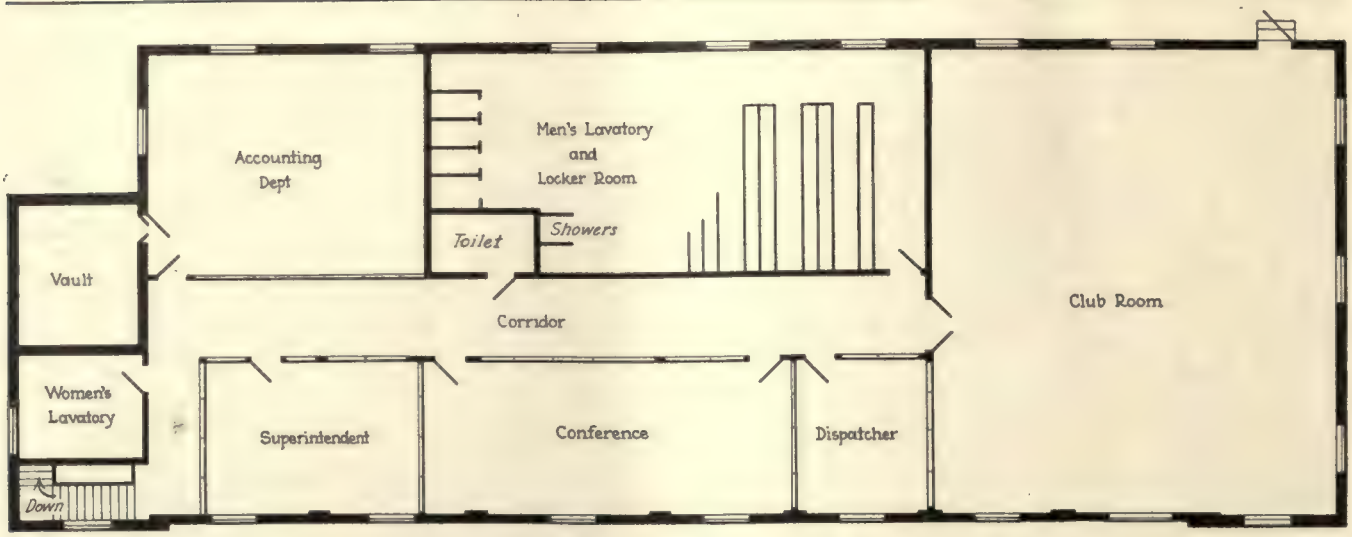
The statement of consolidated income shown elsewhere indicates a general falling off in net returns, so that the rate of return on the investment had decreased gradually from 4.7 per cent in 1920 to 1.3 per cent for the first few months of 1925, according to the committee's report. It is obvious that with this low rate of return the street railway system could not continue to grow and properly serve the city of Williamsport without a substantial increase in gross revenue. For this reason, the committee recommended an 8-cent cash fare, with two tokens for 15 cents and a $1.25 weekly pass. It is explained that the company originally took the position that a 10-cent cash fare was necessary with the same ticket and pass rates, but agreed to a trial on the basis of the committee's recommendations.

The committee compared several appraisals of the company's properties made during recent years and

From the interior of one of Williamsport's new cars both passengers and motorman are afforded an excellent view through the large vestibule window

Many of the old cars in Williamsport have been rehabilitated to conform in general design to the new cars purchased

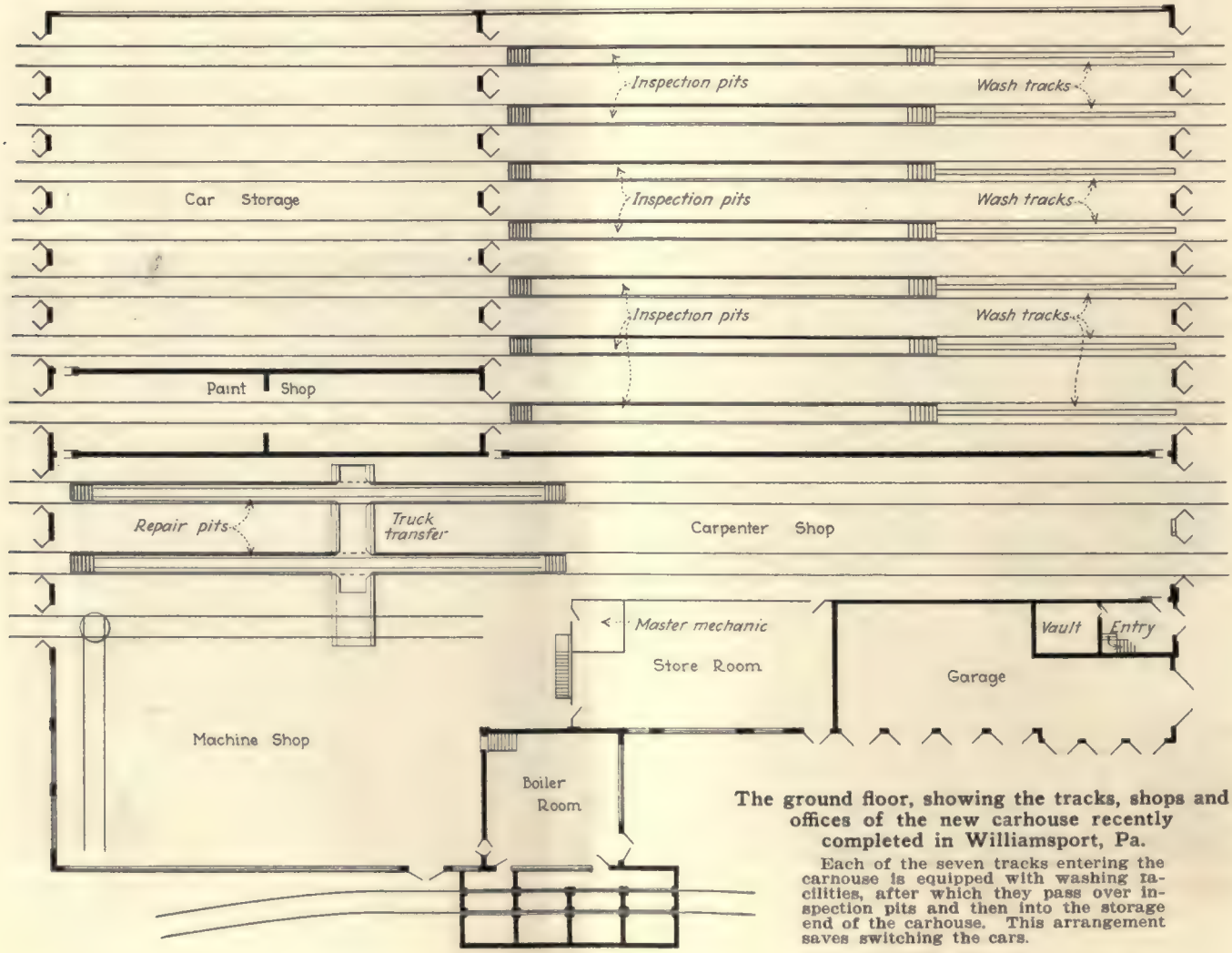
All platform equipment is housed in mahogany cabinets on the new cars. The seats are of full spring construction and covered with genuine leather. Note the absence of bell cords and register rods.




**On the second floor of the new carhouse are the company's offices and employees' club room, as shown by the plans**

found them in close agreement. A valuation as of Dec. 31, 1924, totaling $1,533,023 was finally determined as a basis on which a fair return should be earned. The committee further investigated the cost of power purchased from the Pennsylvania Light & Power Company and found this to be at approximately the same rate as paid by other railway properties under similar conditions throughout the state of Pennsylvania. A further finding was to the effect that the street railway system was being operated economically and that no substantial reduction in operating expenses could be made.

To provide adequate service, the committee recommended the immediate purchase of five new cars, the rehabilitation of 32 others, numerous routing and track changes, and the construction of a new carhouse, all totaling $245,770. It held that other items for track reconstruction and extensions, amounting to




**The ground floor, showing the tracks, shops and offices of the new carhouse recently completed in Williamsport, Pa.**

Each of the seven tracks entering the carhouse is equipped with washing facilities, after which they pass over inspection pits and then into the storage end of the carhouse. This arrangement saves switching the cars.

***Williamsport Citizens' Committee makes possible paving relief granted in ordinance of Dec. 30, 1926.***

SECTION 3. The grantee shall repair any damage to street paving within its roadbed, as hereafter in this section defined, caused by the construction, maintenance or operation of its street railway, and in such cases shall restore and replace such street pavement so damaged in good order and repair. Whenever any street or streets, upon which the tracks of the grantee are laid or shall hereafter be laid, shall be paved, repaved or repaired, the additional cost of such paving, repaving or repairing occasioned by the existence of such tracks on such streets shall be paid by the grantee. Such additional cost shall be deemed to be the difference between the cost per square yard or other unit of paving, repaving or repairing within the roadbed of the grantee and the cost of a similar unit outside of said roadbed. The term roadbed, as herein used, shall mean that portion of the street between the rails of each track and for such distance outside of the rails as the ties under the rails shall extend beyond the rails. The grantee shall have the option of doing the work within the limits of its roadbed in the same manner and with the same material as is used in other portions of a street being paved, repaved or repaired, or in such manner and with such materials as shall be agreed upon with the City Council, and for doing such work the grantee shall accept from the city, as full payment for such work, such sum as will equal the cost of paving, repaving or repairing in the same manner an equivalent area outside of the grantee's roadbed. The snow and ice removed from grantee's tracks, and constituting an interference with public travel, shall be removed by the grantee.

$69,000, should immediately follow, and that within the course of the next five to ten years additional expenditures totaling $193,000 will probably have to be made.

At the time the report was presented the local street railway companies paid a city tax of $50 annually for each car operated. Competing transportation mediums pay no such tax and therefore it was recommended that this burden should be reduced to $1 per car per year. The committee also recommended that the company be relieved of the paving burden which exists today as a heritage of horse car operation.

### BUSES NOT CONSIDERED FEASIBLE AS SUBSTITUTE

Motor buses for transportation service in Williamsport were carefully considered as a substitute for trolley cars. The committee agreed that the fare under such conditions would have to be at least 10 cents. It felt that it would be impracticable to operate buses outside of the paved street areas, and that in the winter months, because of deep snows, such service would not be as reliable as car service. If buses were used, it held many large residential sections would be left without common-carrier transportation, which would restrain city development. The downtown streets in Willimsport are fairly congested with traffic at the present time and with the substitution of buses for street cars this condition would be greatly aggravated, according to the report, as several buses would be required for each street car replaced. Four buses are now operated by the railway company as a supplement to its rail service.

The committee concluded this portion of the study by strongly recommending the continuance of street railway service with the additions and improvements recommended. No public benefit was found in the operation of four separate street railway companies, and the necessary ordinances to provide a suitable working agreement for a new company, consolidating all of the four companies, were recommended.

The wages paid conductors and motormen on the local

Modern carhouse, shop and office recently completed in Williamsport, Pa. Considerable attention and expense were devoted to architectural design

Part of the track reconstruction program under way following recommendations of the Williamsport Traction Committee that will extend over several years

railways were below what they should be, in the opinion of the committee, and an increase of 4 cents per hour was recommended.

Emphasis was laid on the fact that the operation of a street railway system is a mutual matter between the city served and the company. The city cannot grow without good transportation and the company cannot live without earning enough properly to maintain its facilities and to pay interest on its securities. Every recommendation was strongly urged by the investigating committee as necessary to provide good service.

The report as submitted was accepted by the Mayor, the City Council and also by the Public Service Commission of the Commonwealth of Pennsylvania. Shortly after its submission, the City Council passed an ordinance relieving the companies from the paving burden. Plans were immediately formulated by the companies to carry out their share of the recommendations. The new carhouse and shop has since been completed. Five cars were ordered last year and were delivered to the property during December and much of the recommended reconstruction work on the tracks and other property is under way.

### Five Attractive Cars Purchased to Improve Service

After careful consideration of the factors involved, the Williamsport Passenger Railway decided upon the purchase of five light-weight, one-man, two-man cars arranged for double-end operation as being best suited for its requirements. The cars, built by the J. G. Brill Company of Philadelphia, Pa., are of semi-steel construction, seat 44 passengers, and combine several new features which make them stand out prominently. A brief description appeared in the Jan. 8 issue of ELECTRIC RAILWAY JOURNAL, page 103.

PRINCIPAL WEIGHTS AND DIMENSIONS OF FIVE NEW CARS PURCHASED BY WILLIAMSPORT PASSENGER RAILWAY FROM J. G. BRILL COMPANY

| | |
|---|---|
| Weights: | |
| Car body | 19,460 lb. |
| Trucks | 9,600 lb. |
| Equipment | 9,820 lb. |
| Length over all | 42 ft. 2 in. |
| Width over all | 8 ft. 8 in. |
| Height, rail to trolley base | 10 ft. 10½ in. |
| Truck centers | 19 ft. 8 in. |
| Truck wheelbase | 5 ft. 4 in. |
| Wheels | 26 in. diameter |
| Seating capacity | 44 |

A bright and attractive color combination was used, consisting of a golden orange body with vestibule, letterboard, window sash and posts finished in cream. This combination of colors harmonizes well with the green roof and black trucks. Dull mahogany interior finish is used with an agasote headlining finished in ivory with trimming of Valdura red and tan enamel.

The Brill No. 201-B seats give the appearance of individual cushions and backs. They are of heavy upholstered construction, with deep spring cushions, padded backs, and are covered with genuine leather. With a width of 36 in. and a 30 in. spacing between seats comfortable riding space for two passengers is insured. The cars have seven transverse seats on each side and four longitudinal seats, one in each corner, all finished alike. The floors of wood are double on both sides of the 30-in. aisle. Within the aisle area, a single thickness of flooring is used with a flexible punched leather mat constructed in two pieces that extends the full length of the car body in the recess.

Instead of glass in the upper sash, Haskelite panels covered with metal on the outside and wood inside are used. The interior is finished to match the balance of the wood trim and the outsides of the panels are painted the color of the sash. With this arrangement, the use of curtains was considered unnecessary.

Thermostatic control of the fourteen cross seat heaters manufactured by the Railway Utility Company is used, the thermostat being set to hold the temperature between 55 and 60 deg. F. when the outside temperature is lower. Individually controlled vestibule heaters are also installed.

A combination electric tail and stop light, manufactured by the Electric Service Supplies Company, is used in conjunction with a dash floodlight on each end. This stop light shows red when the brakes are applied and the car is coming to a stop.

The four-part, two section, air-operated folding doors and folding steps provide an easy unobstructed exit and entrance. The doors at the right of the motorman are operated from the brake valve through Safety Car Equipment Company's ball check engine, and the rear door by means of a selective valve through a National Pneumatic Company engine. All rear doors are interlocked with the air brake and are balanced, during an emergency brake application, so that they may be opened by hand.

Interior illumination is provided by five Electric Service Supplies Company compensating dome lights, installed on the center line of the ceiling, and equipped with 94-watt lamps. The compensating panels are located to permit of easy access and ready inspection.

Four Westinghouse 510-A motors and control are used with Westinghouse brakes and General Electric air compressor. Trucks are Brill light-weight type 177-E-1.

The motorman's front vestibule sash is of unusual width to give clear vision. It is hinged at the top and carried on brackets so that it may be tilted out like an automobile windshield. The platform apparatus is all inclosed in a mahogany finished cabinet so that no parts are exposed except the controller handle, air valve and gauge. An upholstered seat with adjustable back is provided for the operator. A recess in the center of the cabinet gives the operator leg room so that his position is comfortable and all operating controls are within convenient reach.

By the installation of mirrors within the vestibules on the frieze board, and outside of the vestibules on the corner post, a clear view of the interior and the rear step is obtained at all times. The motorman's hand-operated window cleaner affords a means of providing him with good vision under the most severe weather conditions.

### New Carhouse and Shop Completed

The site selected for the new carhouse and shop is in a well built up part of the city, and attention was given to the architecture so that it would blend well with surrounding buildings. The building as constructed is of two stories, steel frame, red brick and art stone trim, with steel frame windows extending the entire length on each side so that ample light is insured. It is 260 ft. long by 200 ft. wide and has a storage capacity for 45 cars in addition to shop and servicing areas.

The first floor is divided by a fire wall extending the full length of the building. On one side are located the wash tracks, inspection pits, paint shop, and storage space. On the other side is the carpenter shop, truck and machine shops, store room, garage, master mechanic's office, boiler room, and store room.

Seven inspection pits are provided, and each track on the West Third Street side is provided with car washing facilities. It is planned to wash cars every three days. After each washing they are run over the pits and inspected. These pits are heated by direct radiation, which will help in the drying process as the cars stand over them during winter months. The interiors of the cars are cleaned by the washing and vacuum process. The pits are well illuminated to facilitate the inspection and light repair work.

Two cars can be placed in the paint shop at once and closed off from the outside, or by means of the center fire door either side of the shop can be isolated from the other.

Heating is by hot air from the unit heater system, each unit being equipped with motor and fan for passing the air through the steam coils of each heater. The temperature is regulated by a thermostat.

On the second floor of the carhouse are the offices of the company and a club room for the employees.

# Cars Rebuilt for "Shore Fast Line"

**Improved Appearance and Greater Passenger Comfort Have Resulted from Reconstruction of Rolling Stock on the Atlantic City & Shore Railroad**

DURING the past several months the cars of the Atlantic City & Shore Railroad, Atlantic City, N. J., have been undergoing thorough overhauling and refitting. Changes have been made to increase the comfort of the passenger, reduce noise and improve the appearance of the car, inside and out.

Plush seats have replaced the cane seats formerly used. This was done by installing new seat covering on top of the old rattan. The process consisted of placing,

High-speed, multiple-unit cars of the "Shore Fast Line" have been improved in appearance by the installation of sheet steel over the old wood side sheathing

Installation of drop steps in place of fixed wood steps has reduced accidents by eliminating projection and has made passenger ingress and egress easier

Plush-covered seats and magnesite flooring have improved the appearance of the car interior. The ceiling is white with gold ornamentation

in order, a ⅝-in. layer of felt, a 1-in. layer of woven hair, a layer of cotton and one of 16-oz. duck. On the outside standard Pennsylvania Railroad plush was used. New plain green pantasote curtains have been installed.

The ceilings are white with gold ornamentation. Cherry woodwork inside the car has been thoroughly cleaned and freshened up. Sash in the monitor deck has been sealed and Garland ventilators installed.

Over the old wood floor a new flooring of magnesite has been laid. This is ¾ in. thick, laid on a foundation of ¾-in.-mesh chicken wire. Two transverse and two longitudinal expansion joints have been provided. In this process the old trapdoors have been permanently closed, and work on the motors and trucks must now be done by raising the car body.

### Steps Brought Within Body Lines

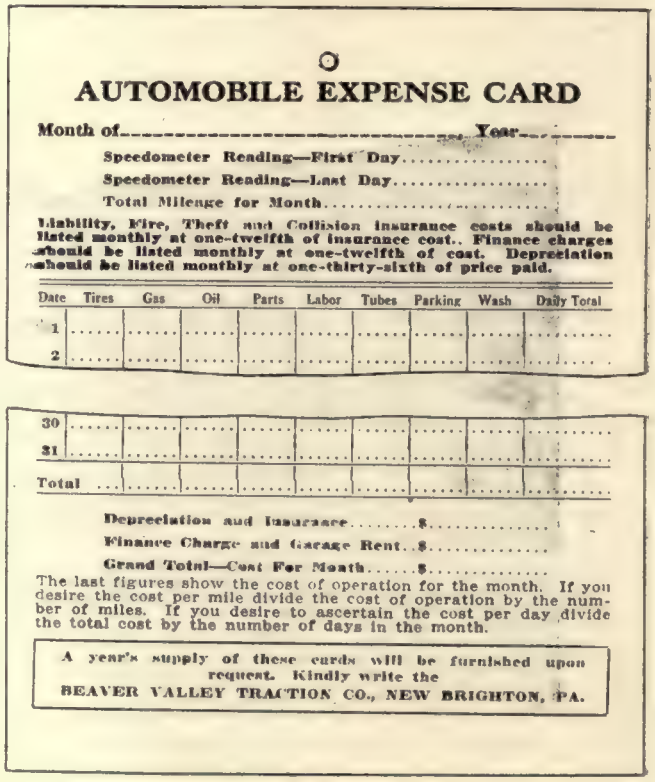
On the platforms O. M. Edwards drop steps have replaced the old fixed wood steps. This has made it possible to bring the steps within the lines of the car body and has reduced the number of accidents as well as made passenger entrance and exit easier. In the process of installing these drop steps it was necessary to remove the outside platform knees. The center knees were therefore reinforced with 4-in. x 4-in. x ½-in. steel tees extending from the bolster to the bumper and anchored to the end sill.

On the outside of the car No. 16 sheet steel has been placed directly over the old wood sheathing, with four panels on each side. Sheet steel also has been used to cover the old wood dashers.

Altogether about 1,000 lb. has been added to the weight of each car. This is believed by the management to be unobjectionable because the cars operate principally over steam railroad right-of-way where the track is obliged to carry heavy freight trains every day and is constructed accordingly.

## An Indirect Argument

OWNERS of automobiles in the territory served by the Beaver Valley Traction Company, New Brighton, Pa., have a chance to compare the cost of operating their cars with cost of street car rides if they use the expense cards that have been distributed by General Manager C. D. Smith. "We are not finding fault with the automobile," he writes, "but are just bringing about an understanding."



**AUTOMOBILE EXPENSE CARD**

Month of..... Year.....

Speedometer Reading—First Day.....

Speedometer Reading—Last Day.....

Total Mileage for Month.....

Liability, Fire, Theft and Collision insurance costs should be listed monthly at one-twelfth of insurance cost.. Finance charges should be listed monthly at one-twelfth of cost. Depreciation should be listed monthly at one-thirty-sixth of price paid.

| Date | Tires | Gas | Oil | Parts | Labor | Tubes | Parking | Wash | Daily Total |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | |
| 2 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | | | | | | | | |
| Total | | | | | | | | | |

Depreciation and Insurance.....$.....

Finance Charge and Garage Rent..$.....

Grand Total—Cost For Month.....$.....

The last figures show the cost of operation for the month. If you desire the cost per mile divide the cost of operation by the number of miles. If you desire to ascertain the cost per day divide the total cost by the number of days in the month.

A year's supply of these cards will be furnished upon request. Kindly write the BEAVER VALLEY TRACTION CO., NEW BRIGHTON, PA.

# Problems of Mass Traffic

*By J. Rowland Bibbins*
**Consulting Engineer, Washington, D. C.**

**Broad consideration of the entire transportation problem in cities shows that all elements, both freight and passenger, must be taken into consideration if real relief and provision for future growth are to be obtained. In this article, abstracted from a paper presented at a conference held in Chicago on April 13 under the auspices of the National Automobile Chamber of Commerce, Mr. Bibbins points out the magnitude of the problem and the multiplicity of elements involved.**

"TRAFFIC" as generally discussed is simply another name for "mass transportation," though rarely so understood. It is worth while to broaden our conception for the moment to examine base principles, trends and future needs to see whether the real problem will be met by any other policy of approach than sound technical planning, based upon transportation experience.

For the traffic problem of today seems to be the result of bad planning of yesterday and lack of appreciation today of transportation essentials.

Look at the following perspective:

Per 1,000,000 persons, the average large city covers 107 square miles, while the metropolitan district covers 364 square miles; the average length of streets is 800 to 2,000 miles; the average street railway track is 300 to 500 miles; the average motor registration is 100,000 to 400,000 vehicles. Population of a large city doubles in five to 40 years, say 30 on the average. In this time city land values increase about three times; city passenger traffic, rail and motor about four times; railroad freight tonnage about seven times; railroad passenger traffic about eight times. Motor registration in the United States doubled in the last 4½ years, with a decreasing rate of increase.

Therefore study now the problem of doubled population without stopping to quarrel just when it will take place. The above perspective of the physical problem today and the clear trends of traffic growth tomorrow are sufficient, for the purpose of this discussion, to put to the acid test the propriety of any opportunist policy, i.e., whether superficial or fundamental measures are in the best interests of the community as a whole, and whether, in our mad scramble for relief, the right emphasis is being placed upon the various elements of the problem.

My perspective of any traffic and transportation problem involves all these elements: rail, transit, bus, truck, taxicab, automobile, horse, pedestrian, and even water transport—all to be co-ordinated in a city-wide, well-integrated, unified, transport system, both passenger and freight, with "track and service" capacity adjusted to local needs, particularly to recognize the differentials in speed and bulk of these various transport agencies.

At the outset, I submit the debatable proposition that the private automobile is not by any means the greatest part of our problem; but that freight transport, which has been almost entirely neglected, looms very large in the picture, especially in the central district.

Time is the first essential—home to work. The 30-minute time zone practically controls the main settlement of our denser city areas. Five minutes saved expands the zone 1 mile; fifteen minutes, 3 miles. Thus, double the populated area can be brought within the 30-minute time zone at the same cost. Here is the basic answer to traffic congestion, and motor competition.

It needs no demonstration that the widespread use of private motors in rush-hour transportation is due largely to the demand for speed, increasing with the spread of our cities. Troublesome as it is, the private motor is fulfilling an economic need, complementary to established public agencies which may not fill that need.

An ideal transport system is essentially based upon speed (and fare) differentials: (1) railroad suburban service, steam or electric, to central terminals or through-routed; (2) rapid transit on private rights-of-way, surface outside, and elevated, depressed or subway inside; (3) automobiles and taxicabs; (4) buses, express and local; (5) by "Shanks' mare." And the last is by no means unimportant, for our surveys show that more than 25 per cent of our major industrial employees walk to work. And industries are being relocated to make this possible.

Now, in practice we are trying to run express, local and freight services on surface streets already cluttered by business. A modern transit system handles 20 per cent of the total traffic in the maximum rush hour, and at least the entire population once every day. Rapid transit system peak loads run from four to ten times midday movement. In large cities, rush-hour tripper cars can make only one load-trip during each rush period. While central district traffic will always be heaviest, cities are developing more and more through-riding and crosstown riding, entirely outside the center.

Transit routing and terminals are thus of fundamental importance, though many systems still adhere, mainly by necessity, to the "town-pump" system of focusing all service and transfer facilities at the center, which involves the serious question of franchises.

After years of study of transit and traffic and the practical aspects of city planning, zoning and motor transport, I submit the proposition that the electric car, mainly surface transit, is still the essential backbone of passenger mass transportation. Each form of motor transport, however, has its particular part to play in a properly unified system of differential speeds, fares and services. In view of the existing paving situation, mounting taxation and financial condition of our cities, it seems idle to talk now of replacing the transit system by buses, except in very specific instances and localities. The automobile must play its part, largely complementary, rather than competitive.

By the same token, it is the clear responsibility of the electric railway industry and city officials to develop

transit by every known means to maximum schedule speed and capacity, as the greatest single contribution to the reduction of central traffic congestion. No adequate city plan or traffic plan will survive the acid test of experience and public need, unless it recognizes these transport elements in true perspective. We shall not by fiat clear our streets of 14,000,000 city motors, nor shall we relegate to the scrap heap 30,000 miles or more of urban railways.

### Freight Transport on City Streets a Serious Problem

The volume of motor freight is exceedingly difficult to estimate, although we know that all of our package or l.c.l. freight requires one or more terminal handlings in our cities. Little progress has yet been made in night haulage of commodities and construction materials, also little progress as yet in consolidated motor tracking to increase the loading efficiency of the city truck, and little or no progress in the scheduling of retail merchandise during off-peak hours for consolidated motor delivery to reduce waste mileage, and avoid peak congestion. Clearly, the tendency of local freight transport is more and more toward the public streets.

I have found in some downtown cordon traffic counts that truck and delivery movement in a large city is perhaps 50 per cent of the automobile movement, in many districts exceeding that of autos. Thus, bearing in mind relative speed, bulk, and character of drivers, it is perhaps not an exaggeration to say that motor freight transport has grown to be perhaps as serious a part of the traffic congestion problem as the private auto. Yet it has received very little, if any, detailed study and consideration. I submit it to be deserving of equal consideration in the traffic-transit plan, not so much by virtue of its volume, but by its obstructive nature.

> AFTER years of study of transit and traffic and the practical aspects of city planning, zoning and motor transport, I submit the proposition that the electric car, mainly surface transit, is still the essential background of passenger mass transportation. Each form of motor transport, however, has its particular part to play in a properly unified system of differential speeds, fares and service.

### "Express and Local" Service

Coming now to specific matters, the only way to insure needed speed differentials is by traffic segregation in the thoroughfare plan with different streets so far as available for transit (which usually means business streets) for fast traffic (usually automobiles and bus) and for slow heavy-duty trucking. A detailed examination of most city street systems will reveal possibilities for securing this segregation. The policy of concentrating all traffic on dense transit streets simply defeats all fast transportation, both rail and rubber.

To secure these speed differentials with existing facilities, we must have limited-stop service for expresses, meaning skip-stops. The bus, although less mechanically suited to frequent stops, will probably have to do this service and stop at the curbs, thus raising the transit schedule speed, perhaps to 15 m.p.h. outside of the central zone. It appears from experience that large-capacity buses, especially double-deckers, can not make the high schedule speed demanded in mass transportation, largely due to design restrictions and unavoidably slow loading and unloading. The small-capacity unit really fulfills a good purpose on a transit trunk. The real reason seven-passenger jitneys have survived in Detroit is because they are needed. Making only two or three stops per mile, they are today able to double the street car speed and far exceed the local buses. Large-capacity buses of course have their field, especially in developing new routes, distinctly not on transit trunks.

Adequate continuous paving lies at the bottom of practical traffic segregation, needing no signs, signals or policemen. A relief route well laid out and reconditioned will immediately be discovered and used.

As there are approximately 1,000 miles of city pavements per 1,000,000 city people, here is perhaps the major economic problem of traffic which has been generally sidestepped, i.e., to provide "tracks" for our growing motor transport system.

Any thoroughfare plan must be financed, presumably on the basis of relative usage and wear. The fact is that thousands of miles of old light pavements have suddenly been thrown into heavy duty service for which they were never designed. It thus appears that financing traffic street pavement at $50,000 or more per mile is a far larger problem than financing railway track at $65,000 per mile, exclusive of pavement. It will not do to waive the matter aside as one of general taxation, and the cost of motor "tracks" will soon have to be recognized as part of the cost of transportation by rubber, as well as rail.

*Terminals.*—Railroads cannot operate without terminals. But we are expecting the same from traffic, an impossibility. I refer to day storage as distinct from short-time parking as one of our "essentials." This very practical problem has been utterly neglected. A few de luxe garages charging 75 cents to $1 per day will have no appreciable effect upon congestion. A day storage service at not more than 25 cents will have to be developed if real results are to be expected. Garaging has thus become a major national utility, and the community itself may have to undertake at cost some form of self-supporting garage service.

*Wider Roadbed.*—Railroads usually had the foresight to provide a 100-ft. right-of-way against their future needs, and expanded by adding one, two or three tracks. But street widening is daily becoming financially more prohibitive. The efficient method of "arcading" to widen roadways to double present capacity while still preserving the old air rights has made no progress, yet wholesale arcading would probably cost not more than 25 per cent as much as full street widening.

The alternative is double-decking, even more finan-

cially strenuous. The South Water Street double-deck improvement along the Chicago River, known as Wacker Way, cost $30,000,000 a mile, the same as the London widening, Kings Highway to the Strand. Although in Chicago the benefit assessment practically absorbed the damages awarded, it is clear that few cities can undertake such an ambitious program over large areas with an additional complication of ascending ramps and the problem of ventilation of the lower level. This has received little consideration, although we introduced it in the design of Wacker Way.

Railroads run on standard gage. Similarly, the old decimal system of street width must give way to a design adjusted to the number of lanes needed and paved accordingly. And the standard width should be adjusted further according as the streets are to handle street cars, buses or trucks, or motors only, for there is 3 ft. difference in the widths of these vehicles, or over 50 per cent of the standard auto width. The relative volume of movement should control; thus a transit street operating 30 seconds rush-hour headway should be more liberally designed than one operating ten minute headway; similarly with buses and trucks.

Street widening, in the absence of local benefit assessment and excess condemnation, is thus the most serious economic problem. We shall never catch up with the budget under present methods. New York City's budget is increasing as the cube of the population, property values as the 2.7 power. Main city land values, the basis of all tax revenue, increase much slower than the square, and in the central high value districts about proportional. Thus, the vicious economic circle is started—first, raising the assessments, which in turn force up the skyscraper, which in turn raise the assessment again—the circle has become a spiral. The day population is concentrated beyond all bounds of efficient mass transportation and sidewalk capacity. Witness one building proposed in New York, holding a young city of 14,000 people, which alone would absorb one-third of the capacity of an entire subway line. This raises the very serious question, whether rapid transit really relieves or simply concentrates central congestion, although through-routing as distinct from loop terminals undoubtedly spreads commercial business. It must spread. For I have recently discovered that high-building cubage is increasing as the square of the population, i.e., four times today's in 1950.

At the very center of this circle lies the real crux—land values and taxation.

### Operating Efficiency

For the present, our one hope is efficiency. A railroad superintendent operating on two tracks of a four or six-track system would promptly be fired. Yet we are doing just that thing in traffic. And my closing proposition is that until we devise some equitable source of further public revenue for vast public improvements higher efficiency in mass transportation, rail and rubber, is our main avenue of present escape. In one large city with 90-ft. streets and 60-ft. pavement, I found within the mile square only 25 per cent traffic efficiency assuming solid parking or perhaps 12 per cent clear. This city was actually encouraging one-line traffic each way, and could easily have doubled its capacity. I think we must come to parallel lanes marked with white paving blocks, or flat white metal plates. Now, the capacity of our streets is reduced at least 50 per cent by "meandering," or straddling lanes, and big buses are notoriously offenders in this respect.

The reversible center line on heavy traffic streets has at least been tried in Cleveland with success. The New York elevated delivers express service with three tracks, reversing the center track morning and evening, making it equivalent to four tracks for express and local. By this simple means, present streets can be increased from 50 to 100 per cent rush-hour peak capacity when capacity is most needed.

In comparison, one-way streets are generally an economic blunder, and in any case, should be in pairs, rather than singly, though cutting the total street capacity to half. Reversible street operation, morning and evening, is clearly impracticable, but reversible center line is practicable.

> WE MUST have both safety and speed. But this never will be realized until mass transportation, both rail and rubber, is designed and operated collectively along modern transportation lines and so conceived in the city plan.

We all grumble when the Capitol Limited or the 20th Century is held up at some block signal, yet I venture the assertion that probably 50 per cent of the total crossing time and capacity of our city traffic intersections is being wasted by badly adjusted "stop-and-run" signals or in hand control by waiting for "stragglers." Yet railroad signal practice pointed the way 30 years ago. The Chicago system of progressive interlocking movement and especially with independent control of each and every intersection, not only as to period, but as to time ratio or balance of traffic, is the one outstanding encouraging development, an adaptation of railroad and subway transportation experience.

### Short Signal Intervals Needed

The shortest possible signal interval is essential for maximum volumetric efficiency. This can only be determined by "calibrating" a traffic crossing under different load conditions, just as a voltmeter is calibrated for accurate reading. It is general observation that the usual run of signal installation has retarded transit and traffic movement throughout the country and diverted traffic from the logical artery to those less suited. Example, one of our largest cities installed a stop-and-run system, 100 seconds cycle, on its main business trunk carrying rush-hour car service at 22 seconds headway. Result, which any transportation man could foretell, from 2 to 3 minutes added trip time to every car entering the business district. This is not efficient transportation or planning. It is not enough to hide behind the slogan "order and safety." We must have both safety and speed. But this never will be realized until mass transportation, both rail and rubber, is designed and operated collectively along modern transportation lines and so conceived in the city plan.

New cars of this type placed in service Jan. 1, 1927, on the Fitchburg & Leominster Street Railway have reduced operating expenses about 15 per cent and increased the gross revenue

# Rehabilitation Increases Riding

## on the Fitchburg Railway

*By Emerson W. Baker*
President Fitchburg & Leominster Street Railway, Fitchburg, Mass.

**During past year track has been rebuilt, new rolling stock bought and rotary converters installed in old power house. Energy is now purchased. Operating expenses have been reduced about 15 per cent**

NOT much more than a year ago the Fitchburg & Leominster Street Railway, with its 40 miles of track serving these two Massachusetts cities and also Lunenburg, Shirley and Ayer, was on the verge of bankruptcy. Buses were being given the preference by the traveling public and street railway patronage was fast disappearing. As a member of the law firm of Baker & Baker, counsel for the company, the writer had become thoroughly acquainted with its problems. To meet this emergency a plan of reorganization was carefully worked out. Today, scarcely more than twelve months since the reorganization was effected, the Fitchburg & Leominster Street Railway is coming back into its own.

Before the advent of the automobile this railway was one of the most prosperous properties in the entire state. Its bonds were gilt edged and its notes were sought by banks. Its tracks and equipment were well maintained. Its income was constant and adequate and its dividends were regular and satisfactory. For years the stock sold at many points above par. But with the coming of the auto this situation gradually changed. The income shrank from year to year until it seemed almost as though there would be no stopping point.

The company had a funded debt of $400,000 and more than $700,000 of unsecured notes, as well as $450,000 of stock. Before the bonds came due on Feb. 1, 1921, they were extended until Feb. 1, 1926, with interest at 7 per cent. The notes carried interest at 6 per cent. This made the annual fixed interest charges about $70,000.

In the spring of 1925 it was apparent that something

drastic must be done if the railway was to be saved. So the writer, purely as a volunteer but with the knowledge and friendly co-operation of a noteholders' protective committee, went about the state and talked with as many of the bondholders as possible. He pointed out to them that unless they gave some assistance on Feb. 1, 1926, they would find the street railway company on their hands and would be faced with a serious impairment in the value of their bonds. Somewhat later a meeting was held at Fitchburg attended by a large majority of the bondholders. There were present also representatives of the noteholders and stockholders. They appointed committees to represent each group and delegated to G. A. Gaskill of Worcester and the writer the duty of formulating a definite and constructive plan of reorganization.

As finally worked out this plan contemplated a five-year test period to determine what could be done. The bondholders were asked to accept 5 per cent and 4 per cent instead of 7 per cent. The noteholders were asked to accept 1, 2, 3, 4 and 5 per cent interest for the first, second, third, fourth and fifth years. The stockholders were asked to place their stock for five years with trustees who should be designated by the protective committee and should vote the stock and elect officers during this period.

**Five Studebaker buses of this type have been in service for several months and are proving more satisfactory than the heavier vehicles formerly operated**

On Sept. 23, 1926, the plan became operative. The directors met and elected E. W. Baker as president, B. N. Hodges as treasurer, and L. H. Cushing as manager.

Track was in very bad condition and in some places almost unsafe for operation. A large repair gang was immediately put to work on the roadbed at a weekly cost of about $1,000. A number of lines were rebuilt, the work continuing until halted by cold weather. While this large increase of the payroll was a severe drain on the resources of the company, it was considered so essential to get the track in good condition that there was no alternative. This spring it is proposed to do further work on the track, replace light rails with heavier rails, put in new ties wherever needed and ultimately to have smooth, properly aligned track everywhere on the system.

The cars were almost all ancient, broken down and hardly usable, costing an excessive amount for repairs needed to keep them running. It seemed imperative that the public be given something better in which to ride. Immediately after the reorganization, the company ordered four new 26,000-lb. cars costing $13,000 each. These were built by the Wason Manufacturing Company. It was far from clear how the cars could be paid for even though the terms were only one-quarter down and the balance distributed over a period of five years. By exercising rigid economy, however, the company was able to accumulate sufficient funds to make the first payment, and by Jan. 16, 1927, all four cars were in active service. Four more of the same type ordered in February, 1927, have just been delivered.

Snow-fighting equipment was not dependable and was worn out. This was a serious difficulty because nowadays the best riding occurs on New England street railways during the winter months. A second-hand but satisfactory and effective sweeper was purchased for $1,500. This has proved adequate to take care of the snow problems during the worst storms of the past winter.

The carhouse and power house were dilapidated and their roofs leaked badly. They have been temporarily repaired. Later it will be necessary to put on new roofing, but the expense will not be heavy. One end of the carhouse where buses were sheltered was open to the weather and the heating was inadequate. This has been boarded up and doors installed so that it is now protected and properly heated.

Power house equipment was practically worn out. The steam boilers, originally high-pressure units, had been forced to reduce pressure from time to time by the state inspectors and were in danger of being con-

ANALYSIS OF OPERATING EXPENSES

| | 1927 | | |
|---|---|---|---|
| | January | February | Total |
| Maintenance of way and structures | $2,704.48 | $2,879.07 | $5,583.55 |
| Maintenance of equipment | 2,970.07 | 2,446.82 | 5,416.89 |
| Power | 6,532.98 | 5,968.00 | 12,500.98 |
| Transportation expense | 11,164.21 | 9,054.96 | 20,219.17 |
| Traffic | 165.59 | 114.42 | 280.01 |
| General expense | 2,016.42 | 2,355.48 | 4,371.90 |
| | $25,553.75 | $22,818.75 | $48,372.50 |

| | 1926 | | |
|---|---|---|---|
| | January | February | Total |
| Maintenance of way and structures | $2,082.17 | $5,941.90 | $8,024.07 |
| Maintenance of equipment | 2,507.31 | 2,843.43 | 5,350.74 |
| Power | 7,744.84 | 7,267.60 | 15,012.44 |
| Transportation expense | 11,080.92 | 10,263.16 | 21,344.08 |
| Traffic | 69.57 | 67.49 | 137.06 |
| General expense | 3,513.52 | 2,949.09 | 6,462.61 |
| | $26,998.33 | $29,332.67 | $56,331.00 |

SUMMARY OF REVENUE AND EXPENSES

| | 1927 | | |
|---|---|---|---|
| | January | February | Total |
| Operating revenues | $33,883.75 | $30,678.60 | $64,562.35 |
| Operating expenses | 25,553.75 | 22,818.75 | 48,372.50 |
| Income above expenses | $8,330.00 | $7,859.85 | $16,189.85 |
| Interest | 2,768.00 | 2,768.00 | 5,536.00 |
| Taxes | 960.23 | 960.23 | 1,920.46 |
| Net income | $4,601.77 | $4,131.62 | $8,733.39 |

| | 1926 | | |
|---|---|---|---|
| | January | February | Total |
| Operating revenues | $33,945.13 | $29,896.02 | $63,841.15 |
| Operating expenses | 26,998.33 | 29,332.67 | 56,331.00 |
| Income above expenses | $6,947.80 | $563.35 | $7,511.15 |
| Interest | 5,887.23 | 5,887.33 | 1,774.56 |
| Taxes | 1,047.60 | 1,107.59 | 2,155.19 |
| Net income | $12.97 | *$6,431.57 | *$6,418.60 |

* Deficit.

demned at any moment. The books showed that energy was costing about 2 cents per kilowatt-hour, but the expense probably was even greater than that. A contract was made with the Fitchburg Gas & Electric Light Company to buy energy at a much lower figure. Three modern rotary converters were installed in the old power house. These operate effectively and satisfactorily in place of the machinery which has been removed. Another rotary converter is used as a booster in the Cleghorn district of Fitchburg. All the old machinery has been sold for junk. The converters cost about $10,000 completely installed, but the company has four years in which to pay for them. They are expected to be adequate for its needs for a long time to come. It has been estimated by the engineers that the net saving in energy cost will amount to some $10,000 to $25,000 a year.

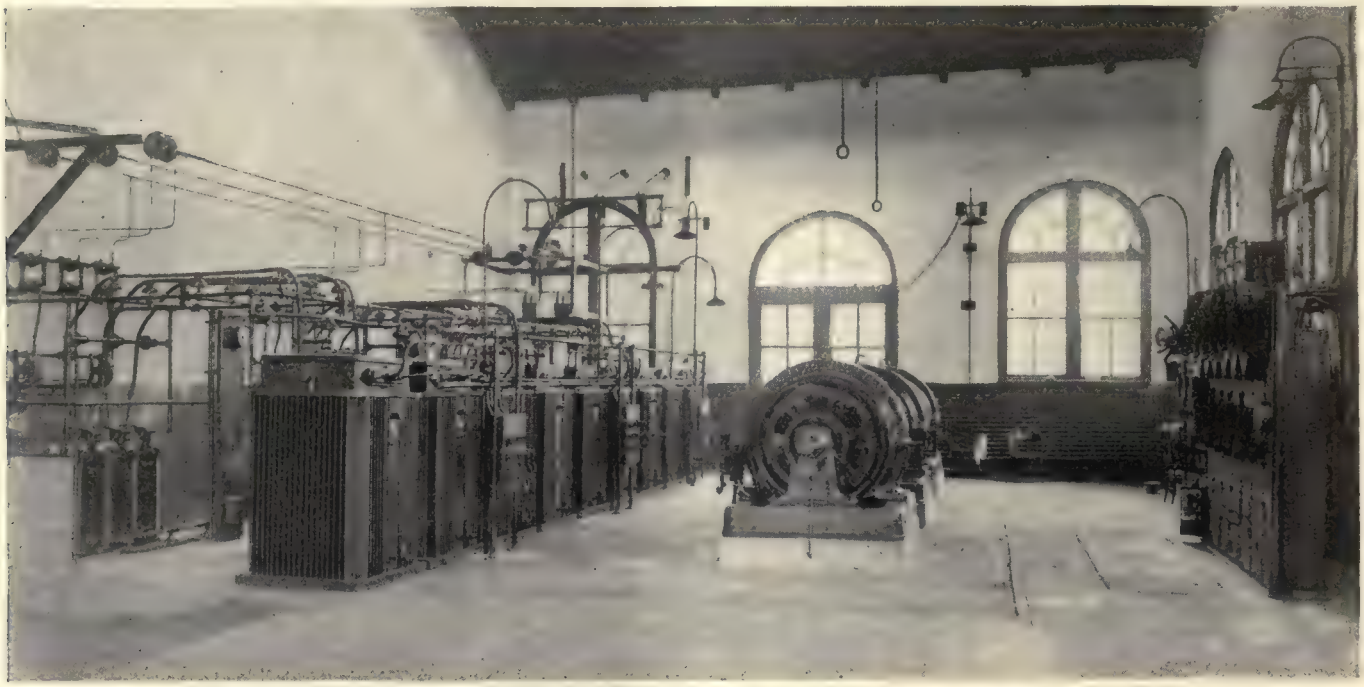
Overhead wire in places was found to be thin and weak. In the spring it is planned to secure some used copper trolley wire for replacement purposes and install it where it is most needed. At a relatively small expense this problem will be solved for the time being.

Whalom Park is owned by this company and is one of the best located natural parks in the state. Its woods were seriously damaged by cyclones a few years ago. Its popularity has been even more adversely affected, however, by the failure to keep up the general tone of the park. It is proposed as soon as the weather permits to repair and repaint the buildings, especially Whalom Inn, and to make them clean and attractive. Only the best amusement features will be tolerated and a conscientious effort will be made to regain for the park the splendid reputation which it formerly enjoyed.

Use of buses presented a complicated problem. In the fall of 1925, because of competition by independent operators and the unwillingness of the city government to protect the railway, the old management felt obliged to go into the bus business. Five 28-passenger buses were leased. These were permitted to parallel the car lines. Roughly speaking, with reference to the period from September, 1925, to the time when the present management took charge, these buses increased the expenses of the railway about $75,000 and added less than $2,000 to the income. It was obvious, therefore, that there would have to be some radical change of policy with respect to bus operation. It was felt that the buses were too heavy and too expensive to operate and that duplication of service was unwarranted and unwise. The lease, therefore, was discontinued and instead the company is operating four light-weight 21-passenger Studebaker buses. Routes have been revised so that the buses are acting as feeders to the principal rail lines.

Large rent was being paid for the offices uptown. This seemed an unnecessary expense and the office has now been moved to the power house, where ample room is available. The dispatcher's office is also located under the same roof.

A study of the records showed that about $5,000 was being paid annually for insurance premiums based on valuations which had long since ceased to be correct. Policies have now been adjusted to suit the present situation and an annual saving in premiums has been effected, amounting to about $3,800.



Rotary converters installed in Fitchburg & Leominster power house, replacing old steam-generating equipment

Taxes had been paid annually to the several cities and towns amounting to about $13,000. These were based on valuations which may have been proper when the company was making money but which were considered in excess of the worth of the property at the time of reorganization. Agreements have been negotiated so that the gross annual taxes henceforth will not exceed $6,000. This cannot be made to apply to the past, or to the taxes now in arrears, but it is expected that in the future there will be a saving of about $7,000 annually.

When the present management took charge it was discovered that the line from North Leominster to Ayer was operating at a large loss. This line was promptly abandoned. For a time buses were substituted, but finally the Boston & Maine Railroad took over the operation of this route, thereby permitting the street railway to concentrate its efforts in its local territory.

Other unprofitable outlying lines have been discontinued also. The mileage of track in operation Jan. 1, 1927, was 25.35 as compared with 41.63 a year before. Daily car-miles have been reduced from 1,845 to 1,685.

Notwithstanding the reduced trackage over which service is now rendered, the gross income for December, 1926, was greater than for any month in recent years. This increase is believed to be due in large part to the four new and attractive cars. The first two months of 1927 show a comfortable increase over the corresponding months of 1926. Moreover, operating expenses have been reduced about 15 per cent as indicated in the table on page 739.

### Net Income Substantially Increased

Thus the net income for January and February was about $15,000 higher in 1927 than in 1926. Within the next few months it is planned to rehabilitate the remainder of the company's rolling stock so that ultimately there will be available sixteen well painted, clean and attractive cars. The management believes that the street railway has a definite and vital place in the life of the community and that nothing thus far has been devised to take its place. The original enthusiasm for rubber-tired vehicles is abating somewhat and the public is beginning to realize that buses are inadequate to handle the transportation in Fitchburg, where the bulk of the traffic is carried during the rush hours.

The policy of the management has been one of entire frankness with the public. It is felt that the railway belongs to the people. Neither the president nor any of the directors receives a dollar for his services. The old idea that the street railway was a kind of financial octopus which fastened itself upon the public, an enemy always ready to attack and to be attacked, no longer prevails in Fitchburg. The public recognizes the attitude of the new management. Indications are that patronage will continue to increase and that a sound and prosperous transportation system will be established.

# Energy Consumption Accurately Measured

**Survey Made to Determine Constant for Every Type of Passenger or Freight Car Operated by Nine Electric Railways in the Dayton Central Power District**

ENERGY used in the operation of all cars in the central district of Dayton, Ohio, is supplied by the Dayton Power & Light Company from its Fourth Street power plant. Nine separate electric railways operate cars through this district, and in order to allocate properly the energy charges it is necessary to determine the consumption for each type of equipment.

In May, 1921, a comprehensive survey of this nature was conducted by the Economy Electric Devices Company, establishing constants for each type of equipment operated. Since these constants were based upon the energy consumption at the car, the bill rendered by the power company was in excess of the figured energy consumption, due to line loss, etc. During the first year following the survey this excess was a comparatively small amount, but shortly thereafter it began to increase until the latter part of 1926, when the excess amounted to approximately 30 per cent of the total. Accordingly, another survey was undertaken to establish new constants.

Because of the thorough manner in which the 1921 survey was conducted it was unnecessary during the recent investigation to go into as much detail as the first time. Quite a number of the cars operating in Dayton are equipped with Economy meters, hence the procedure was much simplified. On cars so equipped the meters were used in checking the old constants, the cars being in regular service. Otherwise a portable meter was used and the car operated as a special through the district. A relation was established between service and special cars by comparing similar types of equipment, and it was possible thereby to check the present energy consumption against the old constants.

Constants for freight equipment were obtained in a like manner. Most of the freight motor cars operating in Dayton are equipped with Economy meters. By riding these trains the investigators were able to obtain the energy consumption of the various freight motor cars hauling different numbers of trailers. By analyzing the data thus obtained constants were derived for light freight motors and for freight trailers. While the energy consumption of a freight train does not vary directly with the number of trailers hauled, the differential is small, and in order to simplify the bookkeeping a single constant was established for all freight trailers.

Practically all of the rolling stock used in city service is now equipped with electric heaters. The exact amount of energy used for electric heat by each company was difficult to determine due to differing standards of heating on the various properties. The amount of heating energy used in proportion to the motor energy in the central district is high, because of the length of time required to move the cars through this area.

Temperature of the outside air is a factor which largely affects the energy consumption of heaters, and it is obvious that as much heat will not be required during a moderate day as on an extremely cold day. This presents an accounting difficulty. The old system required that all trips be reported as "heat trips" during the heating season. It was thought by the investigators that a well-defined relation exists between the average monthly temperature and the amount of energy used for heat and that a more accurate method of calculation should be used. In the following tabulation is shown the per cent of trips recommended to be reported as heat trips during each of the seven months of the year when heaters are used.

| Month | Mean Monthly Temperature | Per Cent of Trips to Be Reported as "Heat Trips" |
|---|---|---|
| August | 73.4 | 0 |
| September | 72.6 | 0 |
| October | 47.0 | 30 |
| November | 40.9 | 60 |
| December | 29.6 | 100 |
| January | 28.8 | 100 |
| February | 33.7 | 75 |
| March | 33.9 | 50 |
| April | 45.6 | 25 |
| May | 62.8 | 0 |

Figures were developed by this survey showing the energy consumption for motors and heaters on each type of car operated by each of the nine railways. By the use of these revised constants and the recommended proportion of heat trips it is believed that the total energy consumption can be accurately divided and the proper amount allocated to each railway.

# The Readers' Forum

## *Standard Specifications Should Be Utilized*

80 PARK PLACE
NEWARK, N. J., April 18, 1927.

To the Editor:

I recently read with considerable interest an article in the Feb. 12 issue of the *Electrical World* covering the high points of an address by C. F. Hirshfeld, chief of the Detroit Edison Company's research department, before the third annual meeting of the public utility group of the National Association of Purchasing Agents at Detroit in January, 1927. This article contains several thoughts that should be of sufficient value to call to the attention of the purchasing agents and engineers of the electric railway industry.

The first is the need for co-operation between them and the necessity for each thoroughly understanding the viewpoint of the other. The next thought that seems to me to be of particular value, especially to the engineer, is the desirability of utilizing existing standard specifications, such as those of the American Society for Testing Materials and the National American Standards as adopted by the American Engineering Standards Committee. It is quite probable that, except in certain very special cases, all practical requirements will be met by one of these standard specifications, which, as Mr. Hirshfeld states, have passed through the trial of fire and the test of actual use over a period of years. They are generally accepted as representing the best commercial manufacturing practice, and if individual engineers are going to continue to insist on using their own particular specifications much of the benefit of standardization will be lost. Mr. Hirshfeld has well stated the case when he expresses the belief that "Mr. Engineer cannot take offense when Mr. Purchasing Agent asks him to explain why the standard material or equipment which many manufacturers are prepared to furnish is not good enough, and he is no proper engineer if he cannot produce a proper answer. There are exceptional cases where something better than the nationally accepted standard is required, but fortunately they are few and far between."

Perhaps a large part of the difficulty can be attributed to a lack of proper knowledge on the part of the engineer as to just what materials are covered by national standard specifications or by those of our national associations, and of their specific requirements. It is quite probable in many cases that he has never taken the trouble to study them and compare them with his own and attempt to convince himself that they would meet his requirements equally as well as his own specifications. The solution of the problem would seem to be a thorough knowledge on the part of the purchasing agent of the various existing standard specifications, at least by title, so that he could then be in a position to call them to the attention of the engineer when the latter submits his own particular pet. There must also be a willingness on the part of both officials to confer on such matters so that each may have a chance to obtain the viewpoint of the other.

The last important matter discussed by Mr. Hirshfeld has to do with a practice in vogue in some purchasing departments of pitting one vendor against another after bids have been received, for the purpose of securing percentage reductions from the first quotations. He calls it "the questionable satisfaction of 'persuading' them into a reduction," and states as his experience that "the cleverer salesmen serve up to you exactly the sort of dish that your past performances lead them to think that you want." It is quite probable that a great many purchasing agents, if they made an honest analysis of the situation in their own cases, would have to admit the truth of this conclusion. It is only once that a vendor will submit a bona-fide quotation and find that in order to secure the order he has to cut an amount equal or approximately equal to his estimated profit. Once it becomes known that this is the practice employed in making purchases, and such news spreads around rapidly, original quotations are submitted on the basis that such cuts will be asked for and the saving to the company becomes imaginary rather than real. It may even mean an increase in cost. The practice certainly creates bad feeling among the vendors and it should be condemned as strongly as possible. It has a decided disadvantage when employed in the case of prices being obtained for use of a contractor in an estimate when competing with other contractors for a job. The result is that the vendor submits lower quotations to the purchasing department which awards contracts upon the basis of original quotations than to the firm which insists upon the bargaining process after receipt of quotations, and the effect on the bid of the latter is too evident to require discussion.

HOWARD H. GEORGE,
Chairman Committee on Way and Structures,
American Electric Railway Engineering Association.

## *Agrees on Need of Research Department*

PITTSBURGH RAILWAYS
PITTSBURGH, PA., April 19, 1927.

To the Editor:

The letter by H. S. Williams, assistant superintendent of equipment Department of Street Railways, City of Detroit, published in the March 26, 1927, issue of ELECTRIC RAILWAY JOURNAL, page 575, was read with a great deal of interest.

It is believed that such a research department is very necessary to the proper functioning of the American Electric Railway Association. Such work as is being done in Joliet, Ill., and Springfield, Mass., on more modern design of street railway equipment is a sign of the need of such a department in the association.

The entire expense of work of this sort should not be borne by individual properties, but should be divided among the companies composing the industry. The only way this may be done is through the establishment of a research department in the association.

W. T. ROSSELL,
General Manager.

## St. Joseph Belt Line Half Finished

THE belt line, a 22,000-volt power transmission line which is being constructed by the St. Joseph Railway, Light, Heat & Power Company, and when completed will entirely encircle St. Joseph, is half finished. More than $75,000 has been expended on it and almost that much more will be used in finishing the job, which will take two or three years more. The big substation on Cook Road, north of the city, was completed and put in operation in December, 1926, and its completion marked the last work on the belt line last year.

# MAINTENANCE MEN, Here Is Your Opportunity—

# *Go After a Prize!*

| | |
|---|---|
| First Prize . . | $200 |
| Second Prize . . | $100 |
| Third Prize . . | $50 |
| Twelve Monthly Prizes, | $25 Each |

IN ELECTRIC RAILWAY JOURNAL'S Maintenance Data Contest you may win the money; you are sure to acquire greater prestige. Help to increase interest in the work of the maintenance man!

For the benefit of new readers and those who may have missed the announcement in last week's issue of ELECTRIC RAILWAY JOURNAL, the conditions for competing for the various prizes offered in the Maintenance Competition are restated in condensed form. Full information will be found in the April 16, 1927, issue, pages 700-701.

Three capital prizes will be awarded for the three best maintenance ideas submitted before Aug. 1, 1927. These are: First prize, $200; second, $100, and third, $50. In addition twelve monthly prizes of $25 each will be awarded, one each month beginning with the May 21, 1927, issue. Articles submitted will be published in the Maintenance Data Sheet Section of ELECTRIC RAILWAY JOURNAL, and a minimum of $5 will be paid for each article published.

ANY employee or official of an operating electric railway or electric railway bus subsidiary may compete for the prizes.

Each contestant may submit any number of items he desires. Each will be judged separately.

The prizes will be awarded primarily on the value of the idea presented and its adaptability to maintenance work on electric railways. The form of presentation will be judged only as to the clearness with which the method or device is described and illustrated.

The author does not necessarily have to be the originator of the idea or device. An article may be submitted by several persons or by a department and need not be written by the person in whose name it is submitted.

Articles may describe any maintenance practice or device used by any department of an electric railway, such as the maintenance of rolling stock, buses, shop equipment, or methods and equipment for overhead line repairs, power distribution and power generation devices, signal work, track and way maintenance, etc.

Articles should be preferably 100 to 200 words in length and should be accompanied by one illustration. Brevity consistent with a proper presentation of information will be given weight in judging articles. In no event should they be longer than 400 words, with not more than two illustrations.

MANUSCRIPTS should be mailed to the editor of ELECTRIC RAILWAY JOURNAL, Tenth Avenue and 36th Street, New York, N. Y. To be eligible for the capital prizes the envelope must bear a postmark dated before Aug. 1, 1927. Photographs or sketches that accompany the manuscript may be in pencil, or blueprints will be accepted. Each item submitted should bear the name or names of the individual or individuals by whom it is submitted and to whom awards are to be made. Photographs, sketches and manuscripts should be marked so that should they become separated they can be identified readily.

Monthly prizes will be judged by the committee, to be announced later, after the articles are published in the Maintenance Data Sheet Section, the best item being selected each month from those appearing in the issue in the month devoted to Maintenance and Construction.

The announcement of the winner each month will be made in the issue devoted to Maintenance and Construction, the third issue each month, following the one containing the items.

The winners of the capital prizes will be announced in the Annual Convention Number of the ELECTRIC RAILWAY JOURNAL to be published in September, 1927.

ELECTRIC RAILWAY JOURNAL offers these prizes to help maintenance men win the recognition in the industry which they deserve. Enter the contest now. Send in as many of your maintenance practices as you like. The JOURNAL will pay $5 for each item published, whether or not it wins a prize. The more items you send in the more chances you have of winning a capital or a monthly prize. Get started early. Articles to be published in the Maintenance and Construction issue for May will have the first chance to win one of the $25 monthly prizes. Maintenance men, here is your opportunity!

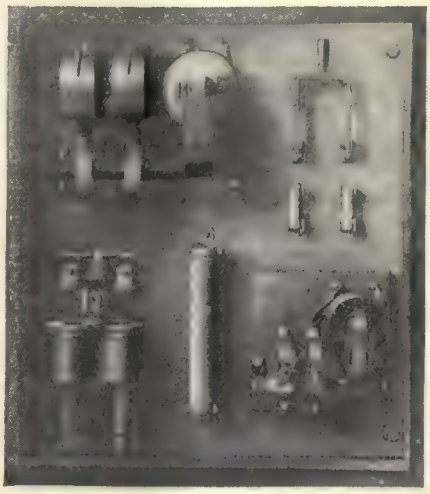
# Maintenance Notes

## Convenient Truck for Armatures

WITH a capacity of eight large-sized armatures, a truck has been constructed in the shop of the Grand Rapids Railway, Grand Rapids, Mich., for running into the oven and supporting the armatures while they are being baked. The truck, which runs on a stationary track between the dipping tank and the oven, can be readily pushed by the workman. The top of the truck is covered with galvanized iron and has holes arranged so that the armatures can be set on their end bells with the commutator ends up just as they are received from the dipping tank. By particular care in spacing the holes the truck is arranged to accommodate different types of armatures.

The baking oven used was constructed in the shop. It is of sheet steel with a height of 6 ft., length 6 ft. and width 5 ft. Each side is made as a complete unit so that it is portable and can be set up quickly. The sections are made with a ⅜-in. x 3-in. x 4-in. angle framework covered with No. 20 gage sheet steel and No. 16 gage galvanized sheet inside. An inside lining of 2-in. Johns-Manville panel cell asbestos insulation is used between the sheets.

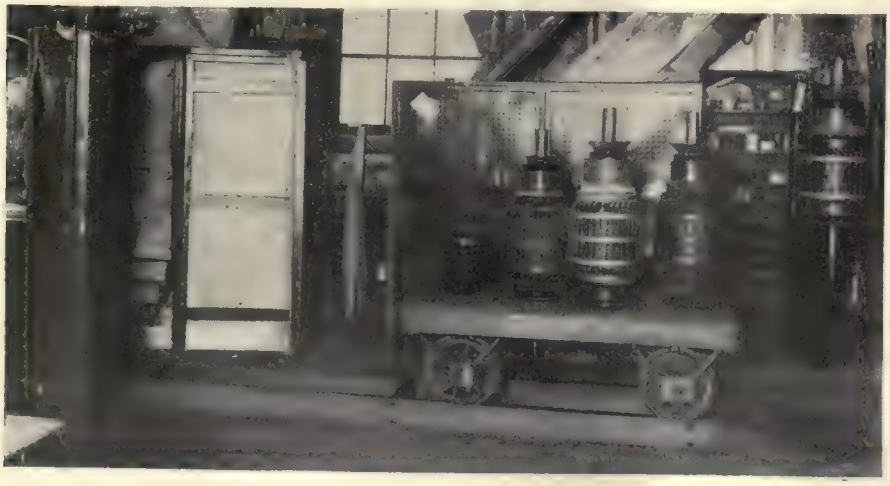
The oven is heated electrically with six 110-volt, 3½-kw. heaters in series across the 600-volt trolley circuit. Thermostatic heat control is used, the control panel being located on the side of the oven. This is fitted with a glass door so that all equipment can be seen readily. Thermostats inside the oven are set so as to indicate the temperature at the commutator neck, as it appears that the solder in the leads is the limiting temperature. Heaters have baffles so as to direct the heat through the trucks and thus prevent its escape at the sides.



The oven control apparatus is covered with a glass door

For ventilation the oven has four 2-in. x 4-in. adjustable louvers and a 5-in. stovepipe from the center of the oven leading outside the building. A damper inside controls the amount of ventilation.

The dipping tank is located under the floor and is 18 in. diameter by 46 in. deep. It is piped to a large barrel outside the building so that it can be refilled easily as the varnish is used. The float has a sheet iron tube, closed at one end. The armature shaft fits into the tube as far as the wiper ring so that varnish cannot get on the shaft when dipping. A similar float used in Montreal for keeping shafts free from varnish was described in ELECTRIC RAILWAY JOURNAL for April 17, 1926, page 676.



Convenient type of armature truck used for handling armatures between dipping tanks and into oven

## Barber Pole Stripes for Safety

ANTICIPATING accidents occurring to passengers entering the drop platform cars of the Memphis Street Railway, Memphis, Tenn., 1¼-in. diagonal black and white stripes have been painted on the end sills. Twenty-five cars were converted recently for one-man operation, and in order to provide for the easy entrance and exit of the passengers it was found necessary to rebuild the cars with drop platforms. The stripes are visible immediately on boarding the car. A lamp installed in a cabinet at the right makes the stripes visible at night.

Barber pole stripes on the end sills prevent accidents. A lamp makes the stripes visible at night

*"Four out of every five have it." Prevent "pyorrhea of your gear teeth" by better maintenance of the gear center distance.*

## Around the World Without a "Pull-in"!

GOING farther than the distance around the world without a pull-in is the record set by the average street car of the Georgia Power Company during 1926, and it is a record of which many larger companies might be envious.

In 1921, when systematic improvement was begun on the street railway system in Atlanta, the average number of miles per pull-in was 3,002. Now, at the end of five years, the number of miles driven without a pull-in has increased to 26,041. Putting it one way, this is an increase of approximately 800 per cent. Putting it another way, it means that each street car in the city runs a distance equal to that around the world before it has to be pulled in for repairs.

At the present time Atlanta is leading the "Southern League" of street railway companies in mileage per pull-in, the average for Little Rock being 15,848 miles, for Birmingham 13,694, for Memphis 9,889, for Mobile 8,633, for Dallas 6,954 and for Covington, Ky., 5,686. Other cities show even less mileage per pull-in.

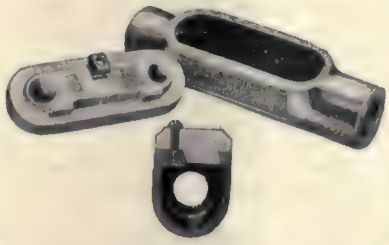
Incidentally, Atlanta is leading a good many other cities in the matter of pull-ins. The figures speak for themselves.

# New Equipment Available

## Wedge-Nut Fastening for Condulet Cover

FASTENINGS without screws which might project inside so as to injure wiring are a feature incorporated by the Crouse-Hinds Company, Syracuse, N. Y., in a new line of Obround condulets. The particular innovation of this line is the method by which the cover is fastened. The inside surface of the condulet at the opening has a slight bevel and the condulet cover is also provided with a corresponding bevel. After the cover is in position it is fastened by what is termed a wedge nut. This nut has beveled surfaces, one side of which fits against the bevel of the condulet while the other side is against the similar surface of the cover. By tightening a single screw on the outside the nut is drawn against the beveled surfaces and the wedging action holds the cover firmly in position.

Some of the advantages claimed are that the wedge nut holds the cover securely in position and it cannot become loosened by vibration. The cover openings are also unobstructed by any lugs necessary for fastening and therefore it is easy to pull conductors into conduits and there are no screws to project inwardly and so injure the conductors. The unobstructed cover opening provides a large wiring chamber which makes splicing and taping easy. The covers and wiring devices can be installed in inaccessible places, as they can be turned to bring the fastening screws outward and a few turns of the screwdriver clamp the covers securely. The cover and wiring devices are complete units so there is no danger of losing small parts. These condulets are furnished in the various sizes and designs which are standard by the Crouse-Hinds Company for other condulets.



New type of Obround condulet with wedge nut fastening

## Flexible Mounting for Electric Hoist

MOUNTING in a fixed position, either overhead or on the ground, is possible with a new "Lo-Hed" electric hoist announced by the American Engineering Company, Philadelphia, Pa. It also can be placed on skids and used as a portable hoist. The hoist is suitable for such purposes as a car puller, hoist, derrick or elevator.

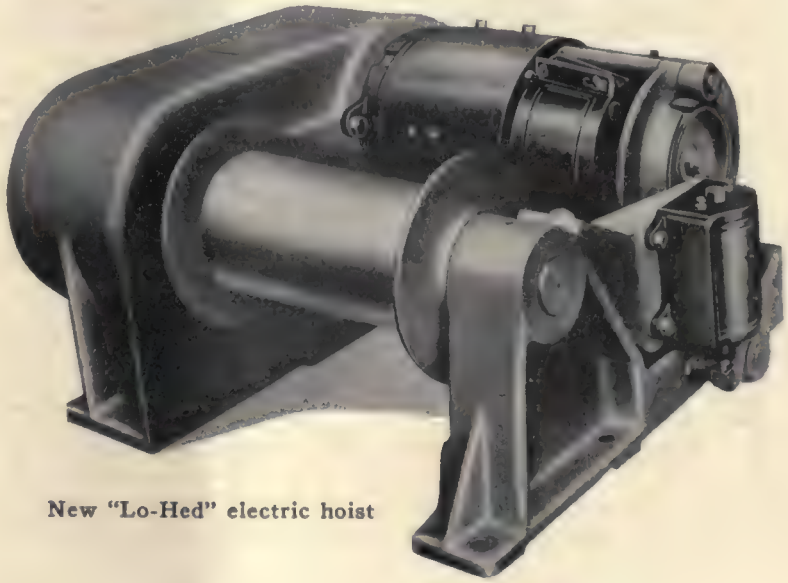
The standard machine has a smooth drum, driven by a motor through a chain of spur gears, all mounted on a common bedplate. It is furnished in sizes for handling loads from 500 lb. to 4,500 lb.

The motor and gears are inclosed completely. Gears are of drop-forged, heat-treated steel, run in an oil bath. Hyatt "high duty" roller bearings are mounted on the ends of all gear shafts. The cover of the gear case is removable.

The drum has large flanges, which prevent the rope from jumping the ends and give maximum stowage capacity. One bearing of the drum shaft is splash lubricated from the gears and the other has an Alemite fitting.

The motor has ball bearings and is especially designed for hoist service. Either d.c. or a.c. motors can be furnished. The controller is of the single-speed, reversing-drum type.

When desired, certain modifications in the hoist can be made by the manufacturer, such as the inclusion of grooved drums, push button and remote control, holding and lowering brakes, extension shafts with additional heads and either air or steam motors.



New "Lo-Hed" electric hoist

# American Association News

## Way and Structures

PROGRESS made in the formulation of recommendations to be presented to the standing committee on way and structures was outlined by the chairmen of the various special committees at a meeting held at association headquarters, New York, on April 7 and 8. The special committee on review of existing standards presented a progress report. Chairman George reported that he had written to the chairman of the A.R.E.A. rail committee requesting information as to the action taken by the A.R.E.A. on the request of the A.E.R.E.A. to make certain revision in its open-hearth girder rail specifications, but that the information had not been received. The chairman will follow this matter up with another inquiry if the information which is requested is not received within a reasonable time.

Mr. Alden requested that the Manual be modified to fix the tolerances for rail template fit as follows:

"No variation will be allowed in dimensions affecting the fit of the joint bars except that the fishing template approved by the purchaser may stand out not to exceed ⅛ in. laterally."

After the matter had been thoroughly discussed by the entire committee and the proposed revision explained by sketches on the blackboard, it was moved to amend the motion by changing the permissible variation to 3/32 in. instead of ⅛ in. The motion as amended was carried without dissenting vote. The committee decided that this matter should be referred to the executive committee as soon as a letter ballot had been taken.

Mr. Merker submitted six designs of existing special expansion joint designs in actual use at various locations in Brooklyn, and called attention to the fact that the special requirements of each particular situation generally made necessary a special design each time an expansion joint was required. It was decided that the matter of expansion joint design be referred to special way and structures committee No. 2 for investigation and report as a part of next year's program.

Mr. Ryder reported that the committee on special trackwork had held a meeting at which the following subdivisions of the work were considered: (1) Switch tongue design; (2) hard center plate design; (3) design of iron binding for iron-bound special trackwork.

Mr. Ryder stated that it was the committee's intention to concentrate its efforts on subjects Nos. 1 and 2, as No. 3 could not be worked out until after No. 2 had been disposed of. His committee submitted a full-sized detail of switch heel design showing the hold-down device. Mr. Entwisle expressed the opinion that certain modifications of the proposed design would have to be made in order for it to be effective.

Mr. Merker submitted a progress report of the special committee on rails, but owing to the fact that the way and structures committee had not had an opportunity to study this Mr. Merker was requested to send a copy to each member of the standing committee, and the latter are then to submit individual written discussion to the chairman of the special committee.

### COMING MEETINGS OF *Electric Railway and Allied Associations*

*April 26-29*—Southwestern Public Service Association, convention, New Orleans, La.

*April 27-29* — American Welding Society, eighth annual meeting, Engineering Societies Building, New York City.

*May 3-5*—United States Chamber of Commerce, annual meeting, Washington, D. C.

*May 6*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

*May 9*—National Conference on City Planning, Washington, D. C.

*May 11-12*—Central Electric Railway Master Mechanics' Association, meeting, Webster Hall Hotel, Pittsburgh, Pa., 9 a.m.

*May 18-19*—Central Electric Traffic Association, meeting, Tuller Hotel, Detroit, Mich., 9 a.m.

*May 31—June 1-2*—Canadian Electric Railway Association, annual convention, Winnipeg, Man.

*June 6-8*—American Association of Engineers, annual convention, Tulsa, Okla.

*June 19-23*—International Street and Interurban Railway Association, annual conference, Copenhagen, Denmark.

*June 24-25*—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

*June 29-July 1* — Central Electric Railway Association, summer meeting, Book-Cadillac Hotel, Detroit, Mich.

*June 30-July 1* — Tramways and Light Railways Association, annual meeting, Bath, England.

*July 27-29*—Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.

*Oct. 3-7*—American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio. Exhibits open Oct. 1 at noon.

Mr. Baker reported for the special committee on track drainage that he had prepared a tentative questionnaire on the subject which was to be sent out at an early date to the maintenance of way members of all A.E.R.E.A. committees this year. He stated that his committee had reviewed preceding reports on the subject that had been referred to them, but that the information was now obsolete and would have to be revised and brought up to date, which the above questionnaire was designed to do.

The committee on bus garage design has decided that the study of "Effect of Garage Design on Insurance Rates" was the most important assignment and that it should be given first consideration. The members have decided to study also the three following subjects, leaving the others referred to them for future attention: (1) Door design; (2) bus washing facilities; (3) ideal layouts for various street frontage conditions.

Mr. Wysor reported that there had been no meetings held but that the rail corrugation committee is slowly collecting data. He reported that the Westinghouse company is making tests covering the determination of hardness tests on corrugated rail to determine the variation in hardness between the crest and trough of the corrugations. He also reported that the services of Professor Ewing had again been retained this year. It was stated that the committee will again submit only a progress report at the October convention.

### Terminal Work Held Up

No report of the committee on joint bus and railway terminals was submitted but Chairman George reported that the special committee chairman had resigned and that an invitation had been extended to another member of the committee to serve as chairman and that it was hoped to get the work of this committee under way at an early date, although it was hardly probable that any definite progress could be made this year.

Mr. Spencer gave a record of the installations of chrome-nickel steel special trackwork, which will be covered by the report of his committee. He stated that he had arranged for a series of weldability test specimens to be made by the Canadian Steel Foundries, Ltd., and that Bethlehem Steel Company, Lorain Steel Company, and William Wharton, Jr. & Company, Inc., had also signified their willingness to make similar tests. It has not been definitely decided whether to have the various manufacturers make these weldability tests on specimens in their shops or to have the specimens sent out to several railway companies for welding tests.

The entire subject was carefully dis-

cussed and it was the general opinion that the welding should be done by three railway members on identical test specimens, with the same welding wire and under as nearly the same conditions as practical, the operator being the only uncontrolled variable. It was suggested that it would probably be desirable to introduce artificial cupping in the test specimens in order to reproduce more accurately the actual field conditions, and that the welding should also be made on a ground surface. The discussion was informal and no definite action was taken by this committee.

SEVEN-INCH RAILS USED EXTENSIVELY

Mr. Alden submitted a tabulation showing the rollings of the various 7-in. girder rails by the Lorain Steel Company for a period of five years and stated that he would prepare comparable data from the Bethlehem Steel Company. This showed that over 50 per cent was the A.E.R.E.A. standard, with an additional 15½ per cent covering the A.R.E.A. standard heavy 7-in. section for use in paved streets. A little less than 9 per cent was the 116-lb. rail sections L.S.-434 and 494. Of the remainder, the greatest percentage was sections L.S.-103-478 and B.S.-103-287-A, which comprised 11.16 per cent of the total. Mr. Alden stated that it was his belief that the Bethlehem figures would show at least as high a percentage from their total rollings and that his committee would probably recommend this 103-lb. section for adoption as a standard light section girder rail, without modification.

Mr. Gailor submitted a tentative draft of a set of specifications which had been prepared as the result of the study and investigation made by the special committee on arc welding and which was now in its hands for study and criticism. He said that the rules of procedure for welding operations are now being studied by the committee. Mr. Ryder gave a comparison between the chemical requirements of the various grades of welding rods in this tentative specification and those for similar grades in the specifications of the American Welding Society. It developed that there were no radical differences.

NEW CODE OF INSTRUCTIONS

Mr. Burke read a letter sent out by Mr. Harvey to the members of the committee on pavement giving the tabulation of the replies that he had received to a questionnaire he had sent out, and also his summary of these replies.

The chairman called the attention of all members of the way and structures committee and all chairmen of special committees to the new code of instructions or rules governing committees, activities and the preparation of reports.

The date and place of the next meeting were discussed. It was agreed to hold it at association headquarters in New York on June 9 and 10, 1927.

Members and chairman of special committees present were H. H. George, chairman; C. A. Alden, E. B. Entwisle, W. G. Hulbert, H. F. Merker, E. J. McIlraith, E. M. T. Ryder, A. T. Spencer, W. W. Wysor, S. Clay Baker, E. P. Roundey, W. R. Dunham, Jr., and C. F. Gailor.

## Power Generation and Conversion

PROGRESS reports were presented at a two-day meeting of the committee on power generation and conversion of the Engineering Association held at association headquarters, New York City, April 4 and 5. Those present were W. E. Bryan, chairman; L. D. Bale, sponsor; C. A. Butcher, H. W. Codding, H. A. Kidder, Otto Naef, F. W. Peters, R. L. Weber, G. I. Wright, F. B. Davenport representing C. E. Bennett; C. L. Gerhardt representing G. W. Saathoff, and E. G. Sohlberg.

Extended discussion was given to the subject of ventilation. Table No. 6 of last year's committee's report was expanded to show the computed temperature rises at 100 per cent and 125 per cent rated load. The handbook figures for watts per square foot radiation per degree centigrade were found to differ from actual test results. This was thought to be because test figures took into account not only radiation, but absorption by the building structure as well. It was decided to use a figure of 0.450 and compute the temperature rise at 100 per cent rating on the basis of this figure.

This year's assignment on ventilation provided for a study of the conditions under which natural ventilation was desirable on the one hand and forced ventilation on the other. In view of the very great variation as to air temperatures, size and construction of buildings, loads to be carried, etc., it was felt that no definite line of demarcation could be drawn and that the report should state the various factors to be considered when designing the scheme of ventilation, and only in a general way the conditions requiring forced ventilation.

Graphs have been prepared for 600-volt rectifiers and converters for both 25 and 60 cycles. The difference in the two was found to be due to the difference in transformer design. Since transformer efficiency can be varied by design and since the efficiency of the rectifier itself is independent of the frequency, it was desided to use one curve for both 25 and 60-cycle rectifiers. It was decided that this year's report should include a table showing the protection necessary or advisable for automatic operation of converters and rectifiers. A questionnaire has been sent out to a number of companies operating rectifiers in this country and answers from these will be tabulated.

## Fire Prevention

RULES for employees were considered by the sub-committee on fire prevention of the American Association insurance committee that met at association headquarters in New York on April 8, with the following present: F. J. Petura, A. D. Knox, J. H. Moran, N. H. Daniels, B. L. Tomes and H. B. Potter, chairman.

The committee discussed the "Rules for Instructions to Employees for Fire Prevention" which are given in Manual Section B100-23, and decided that mention of this section should be made in its report. A complete discussion on the subject of fire prevention was held and at its conclusion it was decided that each of the sub-committee members would submit a draft of a report for use in preparing the final report.

The committee also considered the replies that had been received to the insurance questionnaires sent out some time ago, and urged prompt compliance with the committee's request to fill out and return these questionnaires at the earliest possible moment.

## Hotel Reservation Blank for Cleveland Ready

APPLICATIONS for hotel reservations for the convention of the American Electric Railway Association at Cleveland, Ohio, next October, together with a statement of rates at the various hotels during the period of the convention, will be mailed from association headquarters in New York early during the week commencing April 25.

## Bus Operation

MEMBERS of the committee on bus operation of the Transportation & Traffic Association met in Chicago on April 8 to discuss progress reports of the four sub-committees. The one on fares and fare collection was presented in a letter from E. D. Dreyfus, its chairman. It was the opinion of the members in attendance that this report should contain the practices of operating companies in establishing, determining and collecting fares. It was the thought of R. N. Graham, chairman of the main committee, that if the expressions of opinion of the members were incorporated in a report it would materially benefit present and prospective operators of bus lines, both city and intercity.

Out of questionnaires sent out to 51 companies operating buses, 46 have been returned, according to Mr. Graham. Material in these answers would assist the sub-committee in preparing a more comprehensive report on the subject of fares. D. L. Fennell, Kansas City, suggested that the sub-committee study the question of fares and perhaps work out a formula by which it would be possible to establish equitable rates for various bus services. A. R. Myers, Erie, Pa., suggested that the sub-committee work out such a formula based upon the density of population, riding habit and amount of service.

All of this discussion resulted in a motion by P. E. Wilson, Cleveland, that the sub-committee be directed, first, to analyze the data on fares and fare collection as contained in the questionnaires; second, to summarize this information for city, interurban and charter service, and, third, to make recommendations as to a definite policy to be followed by member companies. It was the opinion of the committee that the rate of fare must be based on the cost of service and should not follow in the footsteps of the early electric railway fare which was based upon a coin, rather than upon the cost of service. Mr. Fennell stated that now is the time for the electric railway industry to break away from the old practice of a coin for a fare. As this subject was

considered the most important of the four, Mr. Graham increased the membership on the sub-committee by adding to it H. M. Bollum, Minneapolis; A. R. Myers, Erie, Pa.; Adrian Hughes, Jr., Baltimore; H. G. Monger, Milwaukee, and B. W. Arnold, Highwood, Ill. These men were asked to write to Mr. Dreyfus and co-operate with him and D. A. Scanlan in preparing a comprehensive report.

Progress reports were read by the sub-committees on equipment; methods, practices and economics of bus operation, and bus operating rules and instructions to personnel. Discussing the latter subject, Mr. Wilson made a motion that the program committee be requested to make arrangements for D. A. Scanlan, Akron, Ohio, to give a demonstration at the Cleveland convention of the Northern Ohio Traction Company's school for bus drivers' instruction.

Members present at the meeting included R. M. Graham, chairman; B. W. Arnold, vice-chairman; D. L. Fennell, S. W. Greenland, M. L. Harry, Adrian Hughes, Jr., H. M. Bollum, Thomas Noonan, E. S. Pardoe, members, and Paul E. Wilson and A. R. Myers, sponsors.

# News of Other Associations

## Traffic Congestion a Paramount Issue

CITY governments have thus far failed to take adequate steps to cope with the traffic problem, according to speakers at a conference held under the auspices of the National Automobile Chamber of Commerce at Chicago on April 13. Mayors, safety commissioners and other city officials were gathered there to consider the problem of traffic regulation from the executive standpoint. Various speakers emphasized the fact that traffic congestion has ceased to be merely a petty annoyance and has now become a major economic problem. Traffic is increasing so rapidly that a situation is likely to arise in a few years requiring the expenditure of much larger sums to provide relief than will be needed if the problem is attacked now.

Every city of 25,000 or more population should have at least one official whose sole duty it is to devote his time to traffic problems, according to Miller McClintock, director of the Erskine Bureau of Street Traffic Research. Congestion has reached its present seriousness, he said, because municipal officials have not attacked it with the same success that they have had in tackling other problems.

A discussion of signals and signs was led by E. J. McIlraith, staff engineer Chicago Surface Lines. Automatic signals, he said, are preferable to traffic policemen wherever conditions justify the expense. To be of any value, however, these signals must be properly timed. Too many cities buy signals like so much hardware and stick them up where it is most convenient, with little regard for time intervals or their relation to other signals. He urged municipal officials to obtain competent engineering advice before signals are installed. Co-ordination of lights to permit continuous flow of traffic at a certain specified speed is the latest development in traffic signaling, he said. This is putting a much needed curb on the driver who endeavors to "beat the lights."

The traffic problem is likely to get worse before it gets better, in the opinion of J. Rowland Bibbins, consulting engineer, Washington, D. C. He pointed out that the private automobile is not the only phase of the problem, but that freight transportation, which has not been greatly developed yet, looms large in the picture of the future. Local freight transportation will tend more and more to use the public streets, he said. He suggested that the best way to speed up traffic is by segregating it by classes, making some streets available for rapidly moving vehicles and others for slow, heavy trucking. Mr. Bibbins' paper appears in abstract elsewhere in this issue.

## Central Electric Traffic Association

IN ACCORDANCE with the action taken, the Central Electric Traffic Association will hold its next regular meeting at the Tuller Hotel, Detroit, Mich., May 18 and 19. The opening session will be called to order at 9 a.m. Eastern Standard time.

Members are requested to submit subjects for discussion to the secretary as soon as possible in order that the docket may be mailed from his office not later than May 2.

## C.E.R.A. Program Discussed

SUBJECTS for the summer meeting of the Central Electric Railway Association to be held at Detroit, June 29-July 1, were discussed at a meeting of the program committee of the association held in Cleveland, Ohio, on April 15. All members were present.

The tentative program includes a session on track construction and maintenance, with a talk on the general subject of standardization and elimination of waste; a session on better business methods for electric railways, city, interurban passenger and freight; one on electrical overhead construction, and one on financing. An address is planned for Wednesday evening.

Entertainment proposed includes a trip through one of the automobile plants in Detroit on Wednesday afternoon; a boat trip to Bob-Lo Island, with a golf tournament, on Thursday afternoon, and a dinner-dance Wednesday evening. A trip around Detroit by motor coach for the ladies is also planned for Thursday morning.

## Central Master Mechanics

MAY 11 and 12 the Central Electric Railway Master Mechanics' Association will hold its next regular meeting at Pittsburgh, Pa. The session of May 11 will be called to order at 9 a. m., Eastern Standard time, at the Webster Hall Hotel. The morning session will be taken up with reports from committees and many important matters are up for discussion by the membership.

At 2 p.m. the same day members will visit the shops of the Pittsburgh Railways, where an opportunity will be given to see the new Pittsburgh car washing system.

On the morning of May 12 there will be a visit to the plant of the Westinghouse Air Brake Company and in the afternoon the Westinghouse Electric & Manufacturing Company's plant will be visited.

## Platitudes Will Not Solve Traffic Problem

TOO much guesswork about our traffic problems, too many attempts to apply quick cures based on opinion rather than detailed engineering study, were reasons assigned for the failure of most American cities to deal more effectively with the problems of traffic congestion by Miller McClintock, director of the Albert Russel Erskine Bureau for Street Traffic Research, speaking April 15 before the first annual Central States Safety Congress, held in Kansas City.

"Those who would solve the American city traffic problem by some vague formula are as certain to be disillusioned as the takers of patent nostrums which claim to cure all human ills," said Dr. McClintock. "Until American officials are willing to recognize the traffic problem for what it is—a detailed and complex engineering problem—little progress will be made.

"There is no single panacea for so complicated a situation. In fact, it may be said that there is no solution for the traffic problem. There is, however, a series of reliefs for it. An engineer taking charge of a complicated machine that has not been properly lubricated turns his attention to oiling the various bearings of the mechanism in order that the friction from a large number of sources may be reduced. So in dealing with the traffic problem of a great city it is impossible to attempt to bring a solution by the application of some general formula or single remedy. It is necessary to make a minute investigation of the sources of friction and to treat each individual contributor to the general problem in an individual and specific manner.

"Before the public can be educated in methods of street traffic operation which will relieve congestion and add to safety it is first necessary to develop the principles that should be taught. Once careful investigation in each particular city has been made there can be formulated a simple and uniform code of traffic regulation.

"Until this is done vague and general educational programs on public safety matters related to traffic can be of little value."

# The News of the Industry

## Passengers Petition Before Massachusetts Commission

The petition of passengers for decreased fares on the Boston & Worcester Street Railway was recently heard before the Public Utilities Commission. Edward R. Goodwin, who appeared for the petitioners said that the officials of the railway had increased the fares from 5 to 6 cents a zone on Feb. 15, 1927. He declared the Boston & Middlesex line, which serves Natick and Wellesley, charges 10 cents to Newton, while the Boston & Worcester charges 24 cents for the same trip. School children's tickets were also raised at the same time from 5 to 6 cents. For the railway, F. C. Lewis stated that the commuters' books had not been changed, the rate still being 3.7 cents per zone. James F. Bacon, counsel, pointed out that the company had lost $90,000 in the two years of receivership. Patrons had also appeared in protest of bus operation, in installing which the company had difficulty because of the necessity for securing the commission's permission. Bus service, he thought, would remedy some of the trouble. Decision was reserved.

## Philadelphia Transit Plan Would Cost $519,300

Immediate extension of nine trolley and bus lines in various sections of the city of Philadelphia, Pa., is part of a recommendation made to the Public Service Commission on April 19 in a report filed by its Bureau of Engineering. The extensions cited as vital in 1927 by F. Herbert Snow, chief engineer of the commission, would entail a capital outlay of $519,300 by the Philadelphia Rapid Transit Company and additional operating costs of $287,950 a year. Dr. Snow's report follows a three months' exhaustive survey of the transit situation. The document is preliminary to a report which will cover criticism of existing service and a discussion of the taxicab situation, one-man trolleys and other phases of the Philadelphia Rapid Transit Company operations. In the increased service outlined by Dr. Snow 32 additional cars and two more buses would be required.

## No Progress Reported in Seattle Revision Deal

Regarding the present negotiations of the city of Seattle, Wash., with the Puget Sound Power & Light Company for an extention of time for the payment of the principal of the bonds issued to that company when the city took over the local railway, Mayor Landes states that she has been assured that it would be impossible for the city to sell power to the railway at ½-cent a kilowatt-hour, as suggested by A. W. Leonard, president of the power company, in placing the offer for extension before the city. She states, however, that it is believed the power can be furnished at less than 1 cent, the present rate.

## Los Angeles Interurban Fares in Effect for Four Months

In an order issued recently the California Railroad Commission authorized the Pacific Electric Railway, Los Angeles, Cal., to place in effect on one day's notice new rates of fare on its Glendale-Burbank line, the basis for determining these to be:

1. One-way fares shall be based on 2 cents per mile, using the nearest 5-cent multiple, minimum fare 10 cents except where the present one-way fare is 6 cents no change shall be made in such fare.
2. Round-trip fares shall be double the one-way fare where the one-way fare authorized herein is less than 15 cents. Where the one-way fare authorized herein is 15 cents or greater, the round-trip fare shall be 5 cents less than double the one-way fare.
3. Thirty-ride family commutation fares shall be 80 per cent of 30 one-way fares except that no 30-ride family commutation fares will be published between points where the one-way fare authorized herein is less than 15 cents.
4. Sixty-ride individual commutation fares shall be 120 per cent of the present 60-ride individual commutation fares except that no 60-ride individual commutation fares will be published between points where the one-way fare authorized herein is less than 15 cents.
5. Adjustments not specifically authorized in this order may be referred to the commission for determination.
6. These rates to remain in effect for a period of four months and longer if it is found that the revenue on this line does not lessen more than $4,000 per month, compared to the present revenue, but in no event are the temporary rates to remain in effect beyond the effective date of the decision on the original application.

The commission ordered the company to suspend during the pendency of those rates all ten-ride, week-day and monthly commutation fares now in effect on the Glendale-Burbank interurban line. The company was also ordered so to record the revenue that the effect may be analyzed.

The Pacific Electric Railway on Jan. 11, 1927, filed an application with the commission for an order granting permission to increase passenger rates and fares over practically all of its interurban and local railway systems. On March 8, 1927, authority was asked to put into effect, as a temporary experiment a schedule of reduced one-way, round-trip and 30-ride rates, with an elimination of all other commutation rates on a group of the shorter interurban lines.

During the hearings on the supplemental application, many of the communities protested the placing in effect of the proposed trial rates. Agreement was reached, however, between the applicant and representatives of the cities of Los Angeles, Glendale and Burbank that an experimental rate schedule as given above might be placed in effect on the Glendale-Burbank line.

## Nebraska Company Seeks Higher Fares

The Omaha, Lincoln & Beatrice Railway, Lincoln, Neb., has asked the Nebraska Railway Commission for authority to increase its railway fares from 6 cents, plus 1 cent for the second zone, to 10 cents, plus a 2-cent zone fare. It also desires to sell four tokens for 30 cents, good on either its bus lines or cars, and for a 10-cent bus fare with 2 cents added for the second zone, which begins at 45th Street. The new rates asked are the same as those charged by the Lincoln Traction Company, with which it comes into active competition on the north side.

The company has never paid operating expenses, but under the management of J. M. Bramlette has been improving. Mr. Bramlette says that during the last twelve months, on a business exceeding $46,000, the company came within $1,606 of expenses.

## Change Reported in Piedmont & Northern Route

Plans of the Piedmont & Northern Railway, Charlotte, N. C., to extend its service to points in North Carolina have been materially changed, according to a semi-official statement. It is probable now that the proposed extension from Charlotte to Winston-Salem and Durham will be built through the counties of Stanly, Randolph and Chatham instead of by way of Salisbury and Lexington. This route is 50 to 100 miles south of the one first proposed and is practically a direct route between Charlotte and Durham. It would leave Salisbury, Lexington, Winston-Salem and Greensboro far to the north.

It is learned that the application of the company to the Interstate Commerce Commission of extension of lines has been withdrawn and the reason given is that holders of land along the right-of-way proposed from Charlotte to Lexington have asked prices that the company considers exorbitant. The Southern Railway, however, operates from Charlotte to Lexington and on to Greensboro, part of its main line, and from Greensboro to Durham and Goldsboro, its most important branch line. If the Piedmont & Northern were built that way it would parallel the Southern practically all the way.

## Pennsylvania Senate Defeats Paving Bill

The Senate at Harrisburg, Pa., by a vote of 22 affirmatives and 25 negatives on April 11 defeated the bill of Senator Painter which would exempt electric railways from paving for a certain distance on either side of their tracks. A constitutional majority of 26 votes was needed to pass the bill.

## 1926 Payments Swell Chicago Traction Fund

Close to $50,000,000 is now held in the traction fund of the city of Chicago as a result of the payment on April 9 of $2,617,399 to the City Comptroller by the Chicago Surface Lines. The amount represents 55 per cent of the net earnings of the Chicago Railways and the Chicago City Railway for the year ended Jan. 31, 1927. The check from the Chicago Railways, which is now in the hands of receivers, was for $1,631,030, while that of the Chicago City Railway was $986,368.

Under provisions of the 1907 ordinance, which expired on Jan. 31, last, and was extended for six months by the City Council, the Surface Lines are required to contribute 55 per cent of their annual net receipts to the city, such funds to be used either for purchase of the lines by the city or for municipal subway construction. With the payments for last year and some $350,000 in accrued interest, the traction fund now amounts to $49,747,019. The city's share for 1926 is an increase of more than $500,000, or 23 per cent over the amount paid the previous year.

## Rapid Transit Act Killed in St. Louis

The adjournment of the Missouri General Assembly before the Senate could vote on the measure caused defeat of the rapid transit enabling act for St. Louis, Mo. However, C. E. Smith, consulting engineer for the city, who has made a study of the rapid transit needs, has expressed the belief that the Mayor under the existing city charter has the power to appoint a commission, subject to approval by the Board of Aldermen, and to provide funds for a complete survey of the city's transportation needs, the drawing of a definite subway or elevated plan, and to do practically everything the defeated bill authorized.

The chief purpose of the dead measure was to grant the city the authority to designate subways and elevated systems public works, within the legislative definition of public works, and to assess part of the cost against property alleged to be benefited through the rapid transit system.

## City Denies Claims in Omaha

Every claim made to the federal court with respect to the legality and the perpetuity of the franchise of the Omaha & Council Bluffs Street Railway is denied categorically by the city of Omaha in its answer to the suit filed by the Guaranty Trust Company, New York. On behalf of the bondholders the trust company contended that the franchise is perpetual and asked an injunction against interference with its rights or granting permits to bus lines. The answer of the city takes up each step in the corporate development of the company and alleges that in none of the transfers was the law obeyed. It is also claimed that the perpetual rights granted the original company were lost through foreclosure proceedings. The city also contends that the suit is prematurely brought since the city has taken no action to oust the company nor to issue permits for competing bus lines.

City Attorney VanDeusen proposes to test the matter in the state courts and will ask the Attorney-General to bring *quo warranto* proceedings to test the company's rights to use the streets, claiming its franchise expires in 1928. He has frankly pointed out, however, that the city must recognize that the company has occupied the streets for 60 years without molestation, and that court decisions are not strong in their support of the city's position.

## Deathknell Probably Sounded for Boston "L" Legislation

The deathknell of all Boston Elevated Railway legislation for the present year was sounded recently when the House ways and means committee voted to report "reference to the next annual session" on the bill which has already been passed by the Senate to extend public control for fifteen years.

An order had previously been introduced by Alfred E. Bliss asking the Supreme Judicial Court for an advisory opinion as to the Constitutionality of proposals made sometime ago. The Bliss order would ask the Supreme Court to advise the Legislature on the following points:

1. If the period of the lease of the property and franchises of said company to the Commonwealth, as provided in Chapter 159 of the Acts of 1918, is extended for a term of years, may the General Court provide that the Commonwealth shall guarantee the payment of principal and interest of any securities of the company that the trustees may be authorized to issue for the purpose of effecting economies in the fiscal management of the company and of promoting more efficient service to the public?
2. Would the fact that such securities might be outstanding after the termination of said period of public operation and management render such a guarantee inconsistent with the sixty-second article of the amendments to the Constitution or any other constitutional provision?
3. Is it constitutionally competent for the General Court to exempt said securities in the hands of their holders from all taxes levied under state authority?
4. Is it constitutionally competent for the General Court to require the retirement of any class or classes of the company's stock by the exercise of the power of eminent domain, or otherwise?
5. Under any extension of the present system of public operation and management of said company would the provisions of the sixty-second article of the amendments to the Constitution apply to the receipts of the company during the period of such operation and management?
6. Would any such extension be repugnant to the provisions of the sixty-ninth article of the amendment to the Constitution of the Commonwealth?

As a result of the introduction of the order, the Senate laid on the table the bill for extending and improving rapid transit facilities in Metropolitan Boston, proposed by the Metropolitan Planning Division.

## Railway Man Again Honored

J. P. W. Brown, vice-president and general manager of the Nashville Railway & Light Company, Nashville, Tenn., was recently elected president of the Chamber of Commerce of Nashville. This latest of his honors came to him in recognition of his public service record, which Nashville declared had not been exceeded by any other individual. In 1925 Mr. Brown was unanimously voted by all civic clubs to be Nashville's most useful citizen.

## Seattle & Rainier Valley Makes Proposals

Proposal that it be relieved of the payment of a franchise tax after Jan. 1, 1927; that it no longer be required to carry policemen and firemen free, and that it be given an exclusive right to operate buses on Empire Way and Seward Park Avenue has been made to the City Council of Seattle, Wash., by the Seattle & Rainier Valley Railway. The railroad is already in arrears $70,000 on franchise taxes. It asks that the plan advanced by Councilman Oliver T. Erickson for the payment of this back tax be adopted. This plan provides that the income from transfers be converted and that the city agree that all such revenues be applied to franchise taxes already in arrears until the amount is paid.

In return for the concessions asked, the company agrees to pay up its delinquent franchise taxes, to reduce from 10 cents to 8½ cents, the fare charged for rides which include right of transfer to the municipal railway, giving the city a larger share of the fare collected in these cases, and to do certain paving between its tracks.

## Date Set for Oral Arguments in Indianapolis Labor Case

The Indiana Public Service Commission has fixed April 29 as the date for oral arguments in the arbitration case of James Green, an employee of the Indianapolis Street Railway appealing to the commission on grievances including wages, working hours and changes of contract.

As a closing argument recently in support of his claim for arbitration of wage disputes the employers have submitted affidavits to the commission purporting to show that the railway actually earned $9.75 on each share of preferred stock last year. This was in contradiction to the report filed by the company with the commission. Howell Ellis, commissioner, directed the accounting department to study the two statements.

## No-Accident Week in Boston a Success

The "no-accident week" conducted by the maintenance department of the Boston Elevated Railway, Boston, Mass., from March 7 to 12 was marred by only two accidents, as compared with four for the corresponding week of 1926. For the purpose of stimulating competition the department was divided into fourteen units, as follows: Surface lines, road; surface lines, Division 2; surface lines, Division 3; surface lines, Division 4; surface lines, central; rapid transit lines, road; building; equipment; service cars; signal division; tie and timber; George Street yard; steel erection; welding. All of these were free of accidents for week, excepting "equipment" and "tie and timber," each of which had one minor accident. There were 1,100 employees this year, as compared with 1,125 last year, therefore the ratios of employees to accidents were 555 this year and 281 last year.

## Hearing on Binghamton Fare Petition

A public hearing was held on April 19 before Commissioner Brewster on petition of the receiver for the Binghamton Railway, Binghamton, N. Y., to increase fares on its lines in Binghamton, Endicott, Johnson City, Fort Dickinson and intervening territory. The present fare is 7 cents. The company seeks an increase to 10 cents cash fare or ten tickets or tokens for 75 cents. The commission is petitioned to "fix such other rate of fare as will in its judgment result in a fair return on the minimum possible value of the property determined in any way that the commission desires."

The city of Binghamton was represented by Herbert H. Ray, first assistant corporation counsel, who objected to the proceeding on the ground that the commission had no jurisdiction inasmuch as an action is now pending in the courts as to franchise limitation of fare in Binghamton. Mr. Ray said briefs in this proceeding would be filed with the Court of Appeals within a few weeks and argument would be made within ten days thereafter. Testimony was presented by Elmer F. White, auditor of the railway, as to the accuracy of statements filed with the petition. The villages of Endicott, Johnson City or Fort Dickinson were not represented. Adjournment was taken to May 16 at Syracuse in the Courthouse.

## Property Owners Demand Trolley

Residents of the Gravesend section of Brooklyn prefer electric railway service to bus service so strongly that they have just helped subsidize an abandoned rail line to get it.

The line involved runs from Avenue U to Nostrand Avenue. It was abandoned some time ago by the Brooklyn-Manhattan Transit Corporation. Residents pleaded for return of service, and when the Brooklyn-Manhattan Transit suggested installation of a bus service they protested. Finally the Brooklyn City Railroad agreed to operate cars if the residents would put the track in condition. This they gladly agreed to do, putting up $10,000 for expenses. Service started on April 16.

## Prospective Car Service Between Camden and Philadelphia

That the Philadelphia Rapid Transit Company, Philadelphia, Pa., is ready to start negotiations for the right to operate cars across the Delaware River Bridge between Camden and Philadelphia was announced on April 15 in a statement by W. K. Myers to the Bridge Joint Commission. Mr. Myers told the commission that the company had made an agreement with the Public Service Railway to lease the tracks recently authorized by the Camden City Commission in Fourth, Fifth and Mickle Streets on the New Jersey side. These would be connected with the bridge tracks and operated by a subsidiary of the Philadelphia Rapid Transit Company. Following a discussion of present and future toll rates the commission referred the proposal to the executive committee for future hearing. The decision was approved at the March meeting of the commission to notify the Penn-Jersey Rapid Transit Company, another P.R.T. subsidiary, that the bus operating agreement for the bridge would terminate July 1.

## One-Man Car Study in Washington

The Public Utilities Commission of the District of Columbia began a study on April 16 of statistical data on the operation of one-man cars in the principal cities of the United States. This is in view of the warning of the Capital Traction Company and the Washington Railway & Electric Company that only an extended use of this type of car in the district would forestall an increase in fare. The former commission placed itself on record as opposed to any increase in the number of one-man cars.

## Court Reduces Railroad's Highway Assessment

Assessments against the Missouri Pacific Railroad by Road Improvement District No. 1 of Franklin County, Ark., for the construction of a new highway obviously were arbitrary and excessive. So the United States Supreme Court held on April 18, thus upholding the lower court, although the case was reversed and remanded with instructions for new proceedings to determine the amount the railroad properly might be charged. The assessment was $75,686 and the Supreme Court holds that it should not have been in excess of $15,000. Rolling stock and other equipment of the railroad were included in the assessment. The high court held that while the railroad will benefit by the highway, in increased traffic, it also will have losses through automobile competition. It is left to the lower court to determine how much, within the maximum of $15,000, the railroad should pay.

## Fitchburg Company to Operate Over Worcester Abandoned Line

The Fitchburg & Leominister Street Railway, Fitchburg, Mass., has decided to operate over the recently abandoned line of the Worcester Consolidated Street Railway between Fitchburg and Leominster for a 30-day trial to begin April 24. No attempt will be made to re-establish the service between Leominster and the Summit in Worcester.

# News Notes

**Excursion Season On.**—The Interstate Public Service Company started on April 3 its first excursion of the season from Louisville to Indianapolis. These excursions have become a regular institution with the Interstate patrons. The excursions alternate each Sunday, the one on April 10 running from Indianapolis to Louisville. To advertise this service the company used four billboards located in various parts of Indianapolis, where thousands of people look upon them daily. The railway department has prepared a very attractive envelope enclosure that is being mailed out to about 2,500 producers and manufacturers in Louisville and Indianapolis.

**Would Discontinue Service on One Line.**—The Pacific Electric Railway has applied to the California Railroad Commission for permission to discontinue service, and to remove its tracks on its Urbita Springs line in San Bernardino County.

**Token Sale Discontinued.**—The Capitol District Transportation Company, Inc., bus subsidiary of the United Traction Company, Albany, N. Y., by special permission of the New York Public Service Commission discontinued on April 1 the sale of five metal tickets for 35 cents, each token good for one 7-cent fare. The company has an application pending for a 10-cent fare.

**Fares Increased.**—Application of the Bamberger Electric Railroad for an increase in passenger fares between Salt Lake City and Ogden has been granted by the Public Utilities Commission of Utah, on the showing that the gross income of the road has decreased from $184,597 in 1920 to $89,344 in 1926. The commission authorized an increase in both one-way and round-trip fares, amounting to approximately ¾ cent a mile. On this basis the one-way fare between the two points will be raised, effective April 17, from $1 to $1.10, while the round trip rate will advance on the same date from $1.80 to $2. The increase does not in any way affect student fares, commutation fares and mileage books.

**Motorman Pardoned.**—Peter Tabor, a motorman on the lines of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., who had been sentenced to one year imprisonment for manslaughter in connection with an accident in which his car ran into a fire truck, killing one fireman and injuring several others, was granted a pardon recently by order of Governor Zimmerman. One newspaper had published a front-page editorial article stating that the punishment was too severe and alleging that the fire department was as much to blame for the accident as the motorman.

**Ordinance Amendment Introduced.**—At the request of the Pacific Northwest Traction Company, an ordinance has been introduced in the City Council of Seattle, Wash., amending the measure passed several months ago whereby the company was granted an extension of franchise to Jan. 1, 1950, and given the right to continue operation of its cars over the Westlake-Greenwood-Phinney Avenue municipal line and to extend its tracks on Stewart Street to its new terminal building at Eighth and Stewart. The proposed amendment provides that in event the city in the future should construct an elevated or subway along the route and require the railway to use the structure, the charge to the company should not exceed 25 cents per car-mile for the elevated or 40 cents for the subway.

# Recent Bus Developments

## Service Grows in Westchester

Leverett S. Miller, president of the County Transportation Company, a subsidiary of the New York, Westchester & Boston Railway, says the company's buses have been exceptionally well received and well patronized. Tentative plans are announced for electric railway abandonment in the Sound section of Westchester and the installation of motor coach service throughout this area of suburban cities and villages. Port Chester, N. Y., is the projected hub of the system. The carhouse of the New York & Stamford Railway in Port Chester is being converted into a modern terminal garage that will house upward of 74 motor coaches.

During March the County Transportation Company, a subsidiary of the New York, Westchester & Boston, made its appearance in the field of motor bus transit. On April 3 the local railway lines of the New York & Stamford Railway in Port Chester were abandoned and motor coach service was installed. On April 14 the County Transportation Company installed motor coach service for Milton Point in the Rye-Harrison-Rye Beach section of the county.

## Indianapolis Street Railway Takes Over Peoples Motor Coach

The Indianapolis Street Railway, Indianapolis, Ind., asked permission of the Public Service Commission on April 16 to buy stock of the Peoples Motor Coach Company for $500,000. Filing of the petition followed agreement on the terms of sale between the railway and A. Smith Bowman, president of the coach company.

The petition declares that the street car company will merge the bus company and the railway to give the citizens of Indianapolis "adequate, sufficient, city-wide, comprehensive public service" and pledges that additions and extensions to the bus transportation system will be made "as public convenience and necessity may require." Due to independent operation, says the petition, there has been "a substantial and unnecessary duplication of expense" in furnishing required transportation, "which duplication could be eliminated by operating under a single management and with a single organization."

Robert I. Todd, president of the Indianapolis Street Railway, stated that the railway company was taking the Peoples Motor Coach Company over "as is." The present 10-cent fare schedule will remain in force until it can be determined just what has to be done.

The petition sets out that the railway company now operates about 30 buses and that the Peoples Motor Coach Company operates about 40 buses. The annual gross income of the motor coach company from passenger receipts is given as $425,000, and the net income as $15,000. Mr. Bowman said:

Terms were agreed upon by the stockholders only with the distinct understanding that the present organization would be continued and the present service improved and extended. It will be a distinct advantage to Indianapolis if the present motor bus transportation provided by both the street railway company and the Peoples Motor Coach Company can be organized and operated together, with promise of such extension of lines and increase of service as shall be required by the growth of the city.

## Charter Change in Louisville to Permit Bus Operation

Stockholders of the Louisville Railway, Louisville, Ky., have been asked by the directors to authorize a change in the charter of the company to enable it to operate buses, according to a letter sent out by James P. Barnes, president. This does not mean necessarily that the railway will go into the bus business, Mr. Barnes said. Buses are now operated through the Kentucky Carriers, an affiliated company.

The amendment which is proposed follows:

1. To operate direct or through subsidiary buses and other automobile vehicles supplementary to and also in co-ordination and conjunction with its rail lines for the carriage of passengers and freight within and without Louisville, Ky., to any extent that it may from time to time acquire local operating rights to do so, whether upon streets served with rail street cars or not so served to the end that it may furnish complete and comprehensive transportation for Louisville and its vicinity.
2. To acquire, buy, sell and transfer franchise and other operating rights.
3. To borrow money from time to time and to pledge its property and franchises to secure the various loans made by it.

## Amended Contract Delays New York Bus Franchise

Another delay in the matter of awarding franchises for bus operation in New York City was necessitated on April 21 by the decision of the Board of Estimate to change the proposed form of franchise contract to give better protection in case the city should decide to recapture. Four weeks will be required under the law to advertise an amended form of contract. The board has set May 19 as the date when the bus matter will next come officially before it.

## "Rubberneck" Service in Kansas City

Sightseeing bus tours of Kansas City are to be started on May 1, to run on twice-daily schedule and to begin each trip probably at the Union Station, according to a recent announcement of the Kansas City Public Service Company, operator of the railway and bus system.

The company will begin the service as the Kansas City unit of the Gray Line Motor Tours Association, under exclusive rights in the city.

Two buses will be assigned to the new service at the beginning. One of these, a single-deck coach of the street car type, and the other, a parlor coach, will start at 9.30 each morning, negotiating a 12-mile tour of the city in approximately one hour; beginning at 2 o'clock each afternoon one of these buses will cover a 25-mile tour in about 2½ hours.

**Buses on Non-Profitable Runs.**—The California Railroad Commission has granted a certificate to the Napa Valley Bus Company to operate auto stage service connecting Calistoga, Napa County, and Vallejo, Solano County, to be co-ordinated with the operation of train service by the San Francisco, Napa & Calistoga Railway, of which the bus company is a subsidiary. It is proposed to operate bus service in place of a number of non-profitable trains during the off-hours of traffic during the day, as a matter of economy to the railway and of convenience to the public. The commission denied the application of the California Transit Company for a certificate to operate auto stage service betwen Vallejo and Calistoga, finding the contention of public opinion in the Napa Valley that an unlimited bus competition would work disastrously to the railway is well grounded.

**Petitions for Renewal of Bus Certificate.**—In a petition filed with the Michigan Public Utilities Commission the South Shore Motor Coach Company sought renewal of the certificate of convenience and necessity granted in May, 1925, to operate intrastate passenger service between Benton Harbor, Mich., and the Michigan-Indiana state line, a distance of approximately 40 miles. This company is owned jointly by the Gary Railways and the Chicago, South Shore & South Bend Railroad. The recent service over this route, which is a part of a through route between downtown Chicago and Muskegon, Mich., consists of eight trips daily each way. Licenses for 35 motor coaches to be operated under the local permit are also sought in the company's application.

**Bus Line on Madison Avenue Wanted.**—A suggestion that Madison Avenue, New York City, be cleared of surface car tracks to make room for a bus line to be established for operation on Park Avenue was made on April 17 by the Fifth Avenue Association in a letter to the Board of Estimate. The association asked the board to delay decision on the award of bus franchises until the city had acquired the property and franchise rights of the Fourth and Madison Avenue surface lines, which have been offered to it by former Comptroller Charles L. Craig. The latter has options on this line and on the Ninth and the Eighth Avenue surface lines. The letter expressed general condemnation of the proposed bus system awaiting action by the Board of Estimate, in its discussion of the effect of the proposed crosstown routes on traffic on Park Avenue.

**Asks Permit for Bus Line.**—The Duluth-Superior Coach Company, a subsidiary of the Duluth Street Railway, Duluth, Minn., has asked for permission to operate a bus line between Superior and Duluth over the new Arrowhead bridge. The distance of the route is four-tenths of a mile. The company proposes to charge a 25-cent fare. The Minnesota Railroad and Warehouse Commission has taken the application under advisement.

# Financial and Corporate

## $2,500,000 Power Plant Sale at Kansas City

The sale of the power plant of the Kansas City Public Service Company, operator of the railway at Kansas City, Mo., was arranged between William G. Woolfolk, president, and Joseph F. Porter, president of the Kansas City Power & Light Company, purchaser of the plant, in a conference on April 14. The purchase price is announced as $2,500,000. Once the sale has been ratified by the Public Service Commission the railway will purchase power from the light company.

Anticipating the possibility of such a sale, the City Council inserted a provision in the recently voted railway franchise that any amount realized from the sale of the plant should be reinvested in the company's property within a period of twelve months.

According to Chester C. Smith, vice-president of the light company, two new frequency changers will be installed in the railway's plant, with a view to operating the railway from the Northeast power plant of the company in low-demand hours in the mornings. This would make it possible to shut down the railway plant six hours.

The amount to be realized from the sale is in addition to a sum of more than $1,250,000 which remains in the hands of the United States Court for the use of the company, said to be available within the next 60 to 90 days, after a similar amount in first mortgage bonds has been distributed among the personal injury claimants against the predecessor company, the Kansas City Railways.

## Syndicate Takes B.-M.T. Bonds

Brown Brothers & Company, the Bankers Trust Company, J. & W. Seligman & Company and Hayden, Stone & Company, New York, were the purchasers of the $10,262,200 Brooklyn-Manhattan Transit Corporation 6 per cent bonds, due 1968, sold on April 19 by the War Finance Corporation. The bonds probably will not be offered to the public for several weeks.

The bonds acquired by the syndicate represent the balance of $19,000,000 bonds acquired by the War Finance Corporation on the reorganization of the B.-M. T. in 1923. The War Finance Corporation advanced $18,000,000 to the B.-M. T. in 1918 and on the reorganization acquired the $19,000,000 of bonds together with 25,000 shares of no-par $6 preferred stock in the B.-M. T. The preferred stock is still held by the War Finance Corporation.

## Increased Excise Tax Bill Before Ohio Governor

The Ohio Legislature has passed the bill increasing the excise tax on certain public utilities from 1.2 per cent on gross intrastate receipts to 1.5 per cent. The bill is now before the Governor for his consideration and signature.

The utilities excise tax bill was a part of a program worked out by leaders of the Legislature to provide more revenue for the state. Other proposed items in the tax program include an increase in the gasoline tax of from 2 to 3 cents a gallon, an increase in the corporation franchise tax and the adding of ½ mill direct tax levy. The gasoline tax bill has passed the lower house. The direct tax revenue has passed both houses and the corporation franchise bill probably will be concurred in.

The increase in the excise tax will not affect electric railways as such, but will affect electric railways doing an electric light and power business.

## International Utilities Would Buy Lethbridge Railway

An offer of $1,000,000 has been made to the city of Lethbridge, Alberta, Canada, by C. J. Yorath, Canadian representative, in behalf of the International Utilities Corporation, New York, for its 10½-mile railway system, electric light and power plants and all other capital assets. Another bidder for the Lethbridge Utilities is the Calgary Power Company. Both these proposals were turned down by the City Council.

Now the Calgary Power Company and the city are considering a proposal for co-operative conduct whereby the city would buy or sell power to the company as the situation warrants.

The International Utilities Corporation already controls the Canadian Western Natural Gas, Light, Heat & Power Company, familiarly known as the Calgary Gas Company, and the North Western Utilities, known as the Edmonton Gas Company.

# Reorganization Terms Announced for Massachusetts Line

### Conditions Reviewed Under Which Successor to Boston & Worcester Street Railway Will Be Organized—New Owners to Carry on Intensively, but Make No Predictions for Future

DETAILS have been announced of the plan for reorganization of the Boston & Worcester Street Railway, Framingham, Mass. The committee which drew the plan represents the first mortgage 20-year 4½ per cent gold bonds dated Aug. 1, 1903. Under the plan each depositor will receive the par value of his deposited bonds in new securities on the basis of 30 per cent in reorganization bonds, 30 per cent in preferred and 40 per cent in common.

The road appears to be in sore straits. This fact is not minced by W. Eugene McGregor, chairman of the bondholders' committee. Mr. McGregor says that the main problem of the officers of the successor company will be to adjust their policy to this situation created by the greater use of the private auto and the growth of the bus business. According to him the plan proposed provides means for the new financing necessary to convert "into realities whatever the possibilities may prove to be." While the situation is not such that the committee feels justified in making any predictions, there are possibilities. According to Mr. McGregor the fact that operation under receivership has shown a loss is neither surprising nor conclusive evidence of the future.

The chairman of the committee cites as bonds entitled to participate:

Boston & Worcester Street Railway first mortgage 20-year 4½ per cent bonds ($2,460,000 outstanding), accompanied by Aug. 1, 1923, coupons.

Framingham, Southborough & Marlborough Street Railway 5 per cent first mortgage bonds, dated Jan. 25, 1899 ($60,000 outstanding), accompanied by Aug. 1, 1923 coupons.

It is intended to form a new company in Massachusetts to acquire the property rights of the Boston & Worcester Street Railway and the property and rights, if any, now or formerly of the Framingham, Southborough & Marlborough Street Railway when sold under court authority.

The capitalization is subject to the approval of the Department of Public Utilities of Massachusetts. The engineer of the department has submitted a tentative estimate of $2,900,000. Using this as a basis, it is proposed that the new company shall have the following capitalization:

| | |
|---|---|
| First mortgage 20-year 7 per cent bonds | $252,000 |
| Reorganization bonds (to be secured by second mortgage) | 756,000 |
| Six per cent preferred stock | 756,000 |
| Common stock (an estimate merely, the total depending upon the total capitalization approved by the department) | 1,388,000 |

A small amount, not exceeding $10,000, of 7 per cent prior preference stock may be issued. It is explained that this, if done, will be for the purpose of providing the directors of the new company with an additional possible medium for raising new money. It is further explained that under the Massachusetts statute it is important, if the use of such prior preference stock ever becomes practicable and desirable, that a few shares of such stock be issued at the beginning.

All the $252,000 of first mortgage bonds and part of the common stock are reserved for subscription, for the purpose of raising new money for expenses in connection with the receivership and reorganization, for working capital and for other purposes approved by the commission.

Bondholders who do not deposit their bonds will receive merely their pro rata share of the sale price less the expenses which are chargeable against this sale price. To provide the cash needed to pay non-depositing bondholders, a syndicate will receive in return

for the cash furnished for distribution to syndicate participants whatever the non-depositing bondholders would have received, including the rights to subscribe for first mortgage bonds with the common stock warrants.

The remaining $126,000 of first mortgage bonds and the remainder of the common stock are reserved for sale if the directors determine that the proceeds are necessary for the purposes of the new company. If sold before Feb. 1, 1929, these reserve bonds (each with a proportionate amount of common stock reserved) are first to be offered to holders of the warrant previously mentioned. Bonds so reserved which are not sold before that date will remain available for issue by the new company, but the common stock reserved and not utilized before that date will be distributed to holders of the warrants proportionately.

Assuming that all bondholders deposit their bonds and that the whole of the first half of first mortgage bonds is subscribed, the distribution of securities (on the basis of a capitalization of $2,900,000 plus the first mortgage bonds) will be as follows:

| | |
|---|---|
| First mortgage 20-year 7 per cent bonds sold $126,000; available for future sale $126,000; total.. | $252,000 |
| Reorganization bonds (to depositors on basis of $300 of reorganization bonds for each $1,000 of old bonds) ..... | 756,000 |
| Six per cent preferred stock (to depositors on bonds of $300 preferred stock for each $1,000 of old bonds) ..... | 756,000 |
| Common stock, to depositors on basis of $400 of common stock for each $1,000 of old bonds.... | 1,008,000 |
| Bonus with first half of first mortgage bonds (estimated) ..... | 190,000 |
| Reserved as bonus for second half of first mortgage bonds if sold before Feb. 1, 1929, otherwise to be distributed to holders of warrants (estimated) ..... | 190,000 |

It is explained that the amount of common stock available for bonus depends on the decision of the Department of Public Utilities as to the capitalization.

It will be recalled that Franklin T. Miller, receiver of the company, applied to the Massachusetts Supreme Court some time ago for permission to curtail electric railway operation. In order to give the bondholders time to consider the adoption of the plan, Judge Crosby of that court has continued the petition to May 3.

## Abandonment Sought in Auburn

At a meeting of stockholders of the Auburn & Syracuse Electric Railroad on April 15 it was decided to abandon as soon as possible all the railway lines operated by the company in the city of Auburn and from that city to Lakeside Park. The action was taken at the recommendation of the directors following the annual report for last year, which showed a net loss of $87,684. Passenger earnings have dropped from $265,090 in 1920 to $162,730 in 1926.

Had the company wished to continue operation of its lines in Syracuse it would be forced to meet expenditures totaling approximately $290,000 for track relaying, repaving and replacements.

City officials have announced their determination to oppose the company's plea for abandonment before the Public Service Commission unless adequate bus service is guaranteed. The city is served now by buses supplementing the railway lines. No definite provision has as yet been made for new buses under operation of the Auburn & Syracuse or other concerns.

## Refunding in Denver

### Tramway There Also Cuts Amount of Bonds Outstanding by $848,000 —Review of Operation

Arrangements were made recently by the Denver Tramway, Denver, Col., to reduce the outstanding funded debt of the corporation by $848,000 through a refinancing program arranged with Boettcher & Company and the International Trust Company, Denver. The plan provides that all of the company's first mortgage extended 6 per cent gold bonds and first mortgage improvement extended 6 per cent gold bonds, due April 1, 1927, and totaling $2,598,000 be acquired from the holders.

Upon acquisition by the company all of the bonds will be extended, with the mortgage liens by which they are secured, until Oct. 1, 1933, and will be deposited as collateral with the International Trust Company, trustee, as security for a new issue of $1,750,000 to be known as the Denver Tramway 6 per cent first (underlying) mortgage collateral trust sinking fund gold notes, which will mature Oct. 1, 1933.

The difference between the $2,598,000 in old securities to be acquired by the company and the $1,750,000 of the new issue represents a reduction of $848,000 in the funded debt in the hands of the public. The source of the funds necessary for this reduction was not disclosed in the company's statement, but the money is understood to be available from a cash fund set up through assessments levied on common stockholders at the time of the tramway reorganization in July, 1925, and from money carried over from the reorganization and accumulation of depreciation reserves.

The material reduction in the funded debt will not only increase the equity for the general and refunding bonds and the preferred stock but there will be a substantial saving in annual interest charges, which will be utilized to reduce further the liens prior to the junior securities.

Holders of the maturing bonds were given preferential opportunity to acquire the new notes on a 6.25 per cent basis.

In describing the new notes the tramway statement said in part:

> The new collateral notes will be an unusually safeguarded medium-term investment at an attractive rate of interest, to be secured by a first lien on properties valued in excess of $5,900 for each $1,000 note, based on valuation of the United States district court, with earnings for 1926, before depreciation but after allowance for federal taxes, equal to 8.28 times the interest charges on all issues secured by underlying liens to be outstanding with the public after April 1, 1927.
>
> Under this plan there will be outstanding with the public only $2,552,000 principal amount of issues secured by underlying liens on Oct. 1, 1933. Such underlying liens are followed by $6,443,500 principal amount of general and refunding mortgage bonds; $10,416,400 par value of preferred stock and 61,240.8 shares (no par value) common stock, now outstanding in the hands of the public. The depreciated value of all properties owned by system, as of Dec. 31, 1926, was $27,445,668, based on court valuation of $23,514,769 for the city transportation properties as of Dec. 31, 1922.

The $2,000,000 of Denver City Tramway 6s originally matured in April, 1919, at which time the issue was extended to April, 1924, and the interest rate increased from 5 per cent to 6 per

## Conspectus of Indexes for April, 1927

Compiled for Publication in This Paper by
ALBERT S. RICHEY
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| | Latest | Month Ago | Year Ago | Since War High | Since War Low |
|---|---|---|---|---|---|
| **Street Railway** Fares* 1913 = 4.84 | April 1927 **7.43** | Mar. 1927 **7.43** | April 1926 **7.36** | Fe 192 **7 1** | May 1923 **5.88** |
| **Electric Railway** Materials* 1913 = 100 | April 1927 **148.0** | Mar. 1927 **152.1** | April 1926 **154.2** | Sept. 1920 **247.5** | April 1927 **148.0** |
| **Electric Railway** Wages* 1913 = 100 | April 1927 **226.9** | Mar. 1927 **226.7** | April 1926 **224.7** | Sept. 1920 **232** | Mar. 1923 **206.8** |
| **Am. Elec. Ry. Assn.** Construction Cost (Elec. Ry.) 1913 = 100 | Apr. 1 1927 **202.6** | Mar. 1927 **203.0** | April 1926 **201 3** | July 1920 **256.4** | May 1922 **167.4** |
| **Eng. News-Record** Construction Cost (General) 1913 = 100 | April 1927 **209.0** | Mar. 1927 **208.8** | April 1926 **207.0** | June 1920 **273.8** | Mar. 1922 **162.0** |
| **U. S. Bur. Lab. Stat.** Wholesale Commodities 1913 = 100 | Mar. 1927 **145.3** | Feb 1927 **146.4** | Mar. 1926 **151.5** | May 1920 **246.7** | Jan. 1922 **138.3** |
| **Bradstreet** Wholesale Commodities 1913 = 9.21 | Apr. 1 1927 **12.53** | Mar. 1 1927 **12.55** | Apr. 1 1926 **13.11** | Feb. 1 1920 **20.87** | June 1 1921 **10.62** |
| **U. S. Bur. Lab. Stat.** Retail Food 1913 = 100 | Mar. 1927 **153.8** | Feb 1927 **156.0** | Mar. 1926 **159.9** | July 1920 **219.2** | Mar. 1922 **138.7** |
| **Nat. Ind. Conf. Bd.** Cost of Living 1914 = 100 | Mar. 1927 **164 1** | Feb 1927 **165.2** | Mar. 1926 **168.5** | July 1920 **204 5** | Aug. 1922 **154.5** |
| **Steel Unfilled Orders** (Million Tons) 1913 = 5.91 | Mar. 31 1927 **3.553** | Feb 28 1927 **3.597** | Mar 31 1926 **4.380** | July 31 1920 **11.118** | July 31 1924 **3.187** |
| **Bank Clearings** Outside N. Y. City (Billions) | Mar 1927 **19.53** | Feb. 1927 **16.72** | Mar. 1926 **19.66** | Oct. 1925 **20.47** | Feb. 1922 **10.65** |
| **Business Failures** Number | Mar. 1927 **1852** | Feb. 1927 **1458** | Mar. 1926 **1188** | Jan. 1924 **2231** | Aug. 1925 **1353** |
| Liabilities (Millions) | **67 90** | **65.42** | **47 70** | **122 95** | **27 22** |

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

cent. In April, 1924, it was again extended to the present 1927 maturity with the 6 per cent interest continued. The bonds are a first mortgage on 103 miles and a second mortgage on 100 miles of the company's track.

The balance of the maturity is made up of $645,000 of Denver Tramway Power Company first improvement 6s, which originally came due in April, 1923, and were extended to April, 1924, also with an increase in interest from 5 per cent to 6 per cent. At the latter date a further extension to 1927 was secured.

## Heaviest Traffic Ever

### North Shore Road Again Breaks Records—Net Held Up Well —Improves Rolling Stock

Substantial progress was made in 1926 by the Chicago, North Shore & Milwaukee Railroad. According to the annual report of the company the volume of traffic, both passenger and freight, was the greatest in the history of the company and the gross revenue showed an increase of $718,197 over the previous year. The net income showed a decrease from the previous year of $49,203, owing to increased fixed charges resulting from heavy capital expenditures for additions to the physical property, particularly the building of the Skokie Valley route.

In 1926 the company carried 19,461,426 revenue passengers on its rail and auxiliary motor coach lines, an increase of 1,232,266 over the previous year. The freight business of the company totaled 656,754 tons, an increase of 120,659 tons over the previous year.

#### FACILITIES GREATLY INCREASED

The operating revenue was $7,568,362 and the gross income after deducting operating expenses and taxes was $1,814,290. The net income was $731,427. Dividends at the rate of 6 per cent on the $5,000,000 outstanding preferred stock and of 7 per cent on the $6,652,800 prior lien stock issued and outstanding amounted to $729,740. The report says:

> Construction of the new Skokie Valley route increased materially the fixed charges of the company, and while the new line greatly improved the Chicago-Milwaukee passenger service by reducing the running time of trains, and was a necessity because of the contemplated grade separation through the communities on the Shore Line route, some time will be required to develop the territory to make this line self-supporting.
>
> The outstanding feature of the year was the great increase in the facilities of the railroad to enable the company to give the public still better service, a policy which has been followed consistently under the present management.

Among the improvements made by the company during the year and noted in the report was the installation of an electrically operated refrigerator car service, said to be the first of its kind in regular use on any electrically operated railroad in the country.

A new method of handling freight in less than carload lots also was developed by the company during the year. It consists of specially built steel containers equipped with running gear, which after being loaded at the warehouse of the shipper are hauled through the streets by a tractor to the receiving stations of the railroad and there run on to flat cars to be hauled to their destination without having to dismount the bodies from the running gear. The method saves the time and cost of handling the merchandise at receiving stations.

#### ROLLING STOCK AUGMENTED

At the end of the year the railroad was operating 256 miles of single track, the opening of the new Skokie Valley route giving the company four main tracks from Chicago to Waukegan.

The company added to its rolling stock during the year twenty steel passenger coaches, three dining cars, five refrigerator cars and 24 freight cars. It now has a fleet of 47 motor coaches operating in connection with its rail lines and serving rural communities to a distance of 35 miles from the main railroad.

INCOME ACCOUNT OF CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD FOR YEAR ENDED DEC. 31, 1926

| | | |
|---|---|---|
| Operating revenue: | | |
| Passenger and special car revenue | $5,772,023 | |
| Freight and express revenue | 1,299,413 | |
| Miscellaneous revenue | 496,924 | $7,568,361 |
| Operating Expenses: | | |
| Way and Structures | $507,586 | |
| Equipment | 410,955 | |
| Conducting transportation | 2,469,514 | |
| Power | 577,801 | |
| Traffic | 300,354 | |
| General and miscellaneous | 1,378,633 | $5,644,845 |
| Net revenue from railway operation | | $1,923,516 |
| Net auxiliary operating revenue | | 99,807 |
| Net revenues from operations | | $2,023,323 |
| Taxes assignable to railway operation | | 400,837 |
| Operating income | | $1,622,485 |
| Non-operating income | | 191,804 |
| Gross income | | $1,814,290 |
| Deductions from gross income | | 1,082,863 |
| Net income | | $731,427 |
| STATEMENT OF SURPLUS | | |
| Surplus Jan. 1, 1926 | | $733,594 |
| Add sundry adjustments, net | | 72,369 |
| | | $805,964 |
| Net income, Jan. 1 to Dec. 31, 1926 | $731,427 | |
| Profit on sale of real estate | 111,856 | |
| | $843,283 | |
| Dividends paid | 729,740 | $113,543 |
| Surplus, Dec. 31, 1926 | | $919,507 |

COMPARATIVE INCOME STATEMENT OF CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD

| | 1916 | 1920 | 1924 | 1925 | 1926 |
|---|---|---|---|---|---|
| Operating revenue | $1,157,191 | $4,193,669 | $6,198,987 | $6,850,165 | $7,568,362 |
| Operating expense | 714,887 | 3,229,048 | 4,650,030 | 5,066,956 | 5,644,846 |
| Net revenue—Railway operation | 442,304 | 964,621 | 1,548,957 | 1,783,209 | 1,923,516 |
| Net auxiliary operating revenue | ..... | ..... | 800 | 86,994 | 99,807 |
| Net revenue from operation | 442,304 | 964,621 | 1,549,757 | 1,870,203 | 2,023,323 |
| Taxes assignable to railway operation | 66,038 | 151,746 | 298,609 | 408,255 | 400,838 |
| Operating income | 376,266 | 812,875 | 1,251,148 | 1,461,948 | 1,622,485 |
| Non-operating income | 6,208 | 10,332 | 60,155 | 151,673 | 191,805 |
| Gross income | 382,474 | 823,207 | 1,311,303 | 1,613,621 | 1,814,290 |
| Fixed charges | 237,996 | 390,196 | 610,583 | 832,991 | 1,082,863 |
| Net income | 144,478 | 433,011 | 700,720 | 780,630 | 731,427 |

## $2,904,600 of Cleveland Railway Stock to Present Holders

Notices have gone out to the stockholders of the Cleveland Railway, Cleveland, Ohio, about the proposed increase in the stock of the company and outlining their rights to subscribe. Rights adhere to holders of record of April 1 to subscribe at par for 10 per cent of the amount of stock previously held. Subscriptions are payable one-quarter or more on or before July 1, 1927, one-quarter or more on or before Sept. 1 and the rest in one or more installments on 60 days notice from the company. The right to subscribe expires on April 25. A syndicate will take such stock as is not subscribed by present holders.

As indicated previously in the ELECTRIC RAILWAY JOURNAL, the Public Utilities Commission has approved the issue and sale of $2,904,600 of stock. The purpose of the issue is to finance these improvements:

| | |
|---|---|
| 100 street cars | $1,200,000 |
| 50 motor coaches | 600,000 |
| 4 automatic substations with equipment | 1,000,000 |
| West 117th Street operating station | 350,000 |
| Track in Pearl, State and Broadview Roads | 262,000 |
| Service buildings | 207,500 |
| Miscellaneous | 20,000 |

The total of these items is $3,639,500, but the company has stock unissued but heretofore authorized by the commission sufficient to take care of the difference between the present issue and the total of the improvements listed.

## Chicago & Interurban Suspends

Abandonment of operation by the Chicago & Interurban Traction Company, known locally as the "Kankakee Line," has been formally announced by W. W. Crawford, receiver. Service over its 54-mile route between 63d Street, Chicago, and Kankakee, Ill., will cease on April 23, at 11.59 p.m.

The Illinois Commerce Commission approved the abandonment in an order entered on March 9 and the Circuit Court of Cook County confirmed the authority in an order issued by it under date of April 12.

High operating costs and falling revenue due to the competition of automobiles and motor trucks and the greatly improved suburban service furnished by the Illinois Central Railroad as a result of electrification last summer are cited by the receiver as the reasons for the failure of the company to meet operating charges. Hard roads parallel the line practically its entire length. Wages paid employees are on the same scale as those of Chicago Surface Lines employees—a basis very high considering the character of the company's operations.

About 130 employees are affected by the abandonment order. Several independent bus companies, including the Schappi Bus Company of Calumet City, Ill., have been granted permits to operate in the territory previously served by the railway.

# Personal Items

## Who's Who in Kansas City

**Careers Reviewed of Principal Operating Officials of the Successor Company to the Kansas City Railways—Subordinates in the Management and Operating Departments Already Serving**

WHEN the Kansas City Railways receivership was terminated last fall and the property turned over to the new owners, the Kansas City Public Service Company, William G. Woolfolk, president of the new organization, published a list of the operating officials who were to serve under him. At the head of this list was F. G. Buffe, general manager of the property throughout the receivership, who was elected vice-president in charge of operations. The other officials were all retained, although the titles of some were changed. A list of the official roster was published in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 23, 1926, page 786. Now that the reorganization of the company has been completed and the recently announced personnel is conducting the affairs of the successor to the Kansas City Railways under the new franchise, brief biographies of the principal operating officials are appended.

No. 1, W. G. Woolfolk
No. 2, F. G. Buffe
No. 3, P. C. Groner
No. 4, C. L. Carr
No. 5, N. S. Doran

### William G. Woolfolk
President

After graduating from the Sheffield Scientific School of Yale University in 1899 Mr. Woolfolk sought employment with the General Electric Company and was placed in its Schenectady office. With two years of experience in the drafting room, testing department and power and mining engineering departments he went with the Knoxville Railway & Light Company as its general superintendent in charge of operation and reconstruction. He served in this capacity for three years, resigning in 1905 to become superintendent and chief engineer of the Philadelphia & West Chester Traction Company, operating a high-speed interurban service.

In 1906 Mr. Woolfolk entered the employ of Sanderson & Porter, engineers of New York and San Francisco, as an executive engineer. He served as assistant to President E. N. Sanderson of what is now the Republic Railway & Light Company, transacting general light, power and gas business for urban and interurban railway service in Youngstown and Niles, Ohio; Sharon and New Castle, Pa., and surrounding territory. In this capacity he had charge of the operation and reconstruction of these properties.

In 1909 he became financially interested in the Old Dominion Development Company, developing, constructing and operating coal mines in Virginia. As vice-president of this company he not only managed the property but spent a great deal of his time in the mines directing the work of the men. Later he joined again the firm of Sanderson & Porter. That was in 1913. The following year this firm opened a Chicago office and Mr. Woolfolk was placed in charge as Middle Western manager. Because of his wide experience in engineering fields the United States government in 1918 appointed Mr. Woolfolk chief of section in the chemical and explosive division of the War Industries Board at Washington, D. C., and in 1919 he was retained by the government and devoted six months in charge of salvaging surplus material for the Emergency Fleet Corporation. He returned to Chicago in the fall of 1919 and founded the firm of William G. Woolfolk & Company, Inc., transacting a general engineering business. This firm is still functioning and Mr. Woolfolk is its active head.

During the last eight years Mr. Woolfolk has served as consulting engineer to many utilities. In the ordinary course of business Mr. Woolfolk was invited to serve as adviser to the reorganization committee of the Kansas City Railways. Following the formation of a new company Mr. Woolfolk was elected president. The committee felt it needed a man of his experience and ability to refinance and reconstruct the electric railway property of Greater Kansas City.

### Fred G. Buffe
Vice-President in Charge of Operation

Fred G. Buffe, who was elected to the office of vice-president in charge of operation, entered the public utility field in 1908, being first employed by H. E. Chubbuck, then vice-president executive of the Illinois Traction System. He remained with this organization until 1917, first serving as publicity manager and later as assistant to Mr. Chubbuck. He went to the Kansas City Railways in 1917 as assistant to President Philip J. Kealy. In 1919, when James Gibson, general man-

A. E. Harvey

R. W. Bailey

D. L. Fennell

E. E. Stigall

H. H. Cloyd

ager of the property, resigned, Mr. Buffe was appointed general manager. He served in this capacity until the receivership, and one of the first official acts of Senator Wilson and Colonel Fleming, as receivers, was to select Mr. Buffe as their general manager. Last October when the new company took charge of the property he was appointed to his present official position.

The present official and operating organization of this property, recognized as one of the finest in the country, was organized and built up largely through Mr. Buffe's efforts. He is the author of the Employees' Representation Plan, inaugurated there in 1919, which has been copied and placed in effect in many other cities. Mr. Buffe was also responsible for the organization of the Brotherhood and many other employee co-operative activities extant on the property.

Mr. Buffe has a wide acquaintance in utility circles, and is well known throughout the United States through his activities in railway association work. He is the author of numerous papers and articles on electric railway and bus subjects and has addressed many meetings of railway executives and employees in the last ten years.

He was born in Franklin, Morgan County, Ill. He attended Whipple Academy and Illinois College and is a graduate of Illinois Wesleyan University and the Kansas City School of Law. Although admitted to the bar of Missouri, Mr. Buffe has never practiced.

After leaving college he engaged in newspaper work as reporter for the Denver *Post* and the Denver *News and Times*. Later he became part owner and managing editor of the Peoria *Herald Transcript*. It is this experience that has enhanced his reputation as a public speaker, made him one of the best public relations men in the electric railway industry and made his formal presentation of transportation subjects not only forceful but also colorful.

### Powell C. Groner
General Counsel

Powell C. Groner acted as counsel for the reorganization committee of the Kansas City Railways and at the termination of the receivership was appointed general counsel for the present company. He is one of the youngest executives in the street railway field and his outstanding work in connection with the reorganization of this property stamps him as a brilliant corporation attorney.

He was born at Norfolk, Va., Feb. 13, 1892. He received his academic and law education at the University of Virginia, specializing in corporation and public utility law, and was graduated from that famous institution with the class of 1913. From the date of his graduation until 1922 Mr. Groner engaged in general practice in both New York and Chicago, representing the Fifth Avenue Coach Company, among others, during that period. In 1922 he joined the firm of Newman, Saunders & Company, Inc., public utility operators and investment bankers, and has been a member of that organization since then.

### C. L. Carr
General Solicitor

Charles L. Carr became connected with the street railway property in October, 1918, as an assistant trial attorney and later became the trial attorney, trying cases in the trial courts and briefing and looking after same on appeals to upper courts.

When Clyde Taylor resigned as general counsel, the latter part of 1919, Judge Richard J. Higgins, who had been general solicitor, was made general counsel and Judge Higgins transferred Mr. Carr from the trial department to the general counsel's office as his assistant. Mr. Carr served in this capacity until shortly after the commencement of the Kansas City Railways' receivership on Sept. 9, 1920, when Judge Higgins resigned as general counsel and became attorney for the trustees under the first mortgage of the Kansas City Railways. At the same time Judge Kimbrough Stone appointed Judge James E. Goodrich as general counsel for the receivers and Judge Goodrich in turn selected Mr. Carr as his assistant.

Mr. Carr was born in Quincy, Ill., on April 1, 1890. He was graduated from the Quincy High School in 1909 and that same year entered the Northwestern University at Evanston and Chicago, Ill. He was graduated from the liberal arts department of the University at Evanston in 1913 and from the law department in Chicago in 1915. From October, 1915, until October, 1918, he was deputy circuit clerk of Kansas City, Mo., assigned to Division No. 3.

### Rufus W. Bailey
General Superintendent of Maintenance

Rufus W. Bailey on Oct. 15 last assumed charge of the power generation and distribution departments, the way and structures, equipment and bus maintenance departments. In addition to these duties Mr. Bailey will supervise all methods and standards, the laboratory, power conservation, electrolysis investigations, surveys and studies. He went to the Kansas City Railways under F. G. Buffe as assistant to general manager in charge of the Kansas properties in 1919. Early in 1920 he took over the distribution work and in December of the same year assumed charge of the power plant. When H. S. Day resigned in 1922 Mr. Bailey took over the shops and mechanical departments and a little more than a year later, when R. L. Weber left the organization, the research and engineering departments were placed under his supervision.

Under Mr. Bailey's direction the power and equipment departments have reached a high state of efficiency, hundreds of improvements have been made both in working conditions and types of

J. D. Cornell

C. A. Kincade

L. R. Carson

H. M. Smith

H. W. Smith

machines used, and plant accidents have been reduced to a minimum. Many of the safety features incorporated on the buses purchased a year ago by the receivers were invented and patented by Mr. Bailey. He also has applied for patents on the new periscopes and loud speakers now in use on the Kansas City buses.

Mr. Bailey was born in St. Louis, Mo., on Aug. 22, 1877. He was graduated from the high school there and attended the University at Providence, R. I. During vacation periods he was employed by the old Sixth Street car line and the Olive Street line in St. Louis. For two years after leaving school he did erecting work for both the General Electric and Westinghouse companies out of St. Louis, building numerous electric light plants for them.

He served in Cuba throughout the Spanish-American War.

In 1900 Mr. Bailey joined the East St. Louis & Suburban Railway as superintendent of construction. He served in various capacities with this organization, finally being appointed general superintendent of the Alton Division. In this position he also acted as supervisor of a number of properties owned by the E. W. Clark interests. In 1907 he went with the McKinley interests in Peoria and was general superintendent there until he went to Kansas City in 1919.

### Neal S. Doran
Comptroller and Assistant Treasurer

Neal S. Doran, comptroller and assistant treasurer of the Kansas City Public Service Company, first went to Kansas City in 1893 as auditor of the Texarkana & Fort Smith Railroad. He later was connected with various construction companies in building the Kansas City Southern Railway, the Suburban Belt Railroad and the Kansas City & Independence Air Line. He was appointed secretary and auditor of the Kansas City, Mexico and Orient Railroad at its organization in 1901 and continued in that same capacity until June 1, 1920. On that date he was appointed auditor of the Kansas City Railways and remained in that position throughout the receivership.

Mr. Doran was born on July 4, 1870, in Iowa. He received his education in the Pittsburgh, Pa., schools.

### Ernest E. Stigall
Purchasing Agent

Ernest E. Stigall entered the employ of the Kansas City Railways & Light Company in May, 1904, in the accounting department of the light and power division. In 1909 he was appointed cashier and chief clerk of the light and power company and in May, 1911, was promoted to the position of purchasing agent for the Kansas City Railways & Light Company.

Following the granting of a new franchise in 1914, which provided for the separation of the Kansas City Railways from the light and power company Mr. Stigall was appointed purchasing agent for the Kansas City Railways and he has remained with the organization in the same capacity since that time.

Mr. Stigall was born in Stewartsville, Mo., on Dec. 24, 1883. He was graduated from William Jewell College at Liberty, Mo., in 1903 and in the same year went to Kansas City and took a course in Spalding's Commercial College.

### A. E. Harvey
Chief Engineer

A. E. Harvey is a graduate of the University of Illinois, having received his degree in 1891. In 1894 he received the degree of C. E. from the University of Illinois. During his college vacation periods and for two years after graduating Mr. Harvey sought employment with firms where he could gain construction and engineering experience and in April, 1894, was employed by the Illinois Central Railroad in numerous capacities, from that of instrument man to division engineer and road master. In April, 1902, he entered the employ of the Chicago Great Western Railway as division engineer in charge of maintenance and construction. From April, 1905, until February, 1906, Mr. Harvey held similar positions with the Illinois Central Railroad and the St. Louis & Iron Mountain Railroad. In February of 1906 Mr. Harvey became associated with R. A. Elzy in the general railroad contracting business. From 1908 until 1910 Mr. Harvey was superintendent of the Western Division of the Chicago Great Western Railroad in charge of operation and maintenance and from 1910 until early in 1911 was division engineer for the Kansas City Southern Railway. In April, 1911, Mr. Harvey entered the service of the Metropolitan Street Railway as chief engineer and he has been on the property since that date in the same capacity but under different titles. At present he has charge of the construction work of the Kansas City Public Service Company.

### Daniel L. Fennell
General Superintendent of Transportation

Daniel L. Fennell is the only operating official of the company who has never been employed by any other than the railway organizations of Kansas City. During his summer vacation periods of 1902 and 1903, Mr. Fennell was employed as a material clerk on track construction. In June, 1904, he entered the service permanently, being employed as a rodman in the engineering and construction department. While still in this department he served for several months as assistant foreman on track construction. In 1905 he was appointed time keeper and material clerk on track and power plant construction, remaining in this capacity until 1907, when he was transferred to the shops as chief clerk under the master mechanic.

It was on May 1, 1909, that Mr. Fennell joined the transportation department and his first position was assistant division superintendent at 48th and Harrison, the largest division on the property. On June 1, 1910, he was promoted and made division superintendent at 31st and Holmes, remaining there until Oct. 1, 1912, when he was transferred back to 48th and Harrison as division superintendent. The next promotion came on Dec. 13, 1913, when he was made secretary and assistant to the general superintendent. He was appointed superintendent of traffic on Dec. 1, 1916, and organized the present traffic and schedule department.

Mr. Fennell became assistant superintendent of transportation on May 16, 1918, and from Dec. 1, 1918, until March 1, 1919, served as acting superintendent of transportation. On the latter date he received a permanent appointment as superintendent of transportation, and since then has served continuously in the same capacity. For a number of years he has been an officer of the Kansas City Safety Council and the present success of that organization is in a great measure due to his efforts. He was also one of the organizers of the Mid-West Electric Railway Association and served as its first president. Mr. Fennell is 40 years of age.

### Hardy H. Cloyd
Assistant to Mr. Buffe

Hardy H. Cloyd was first regularly employed as construction foreman for an Omaha contractor and in this capacity he had charge of the construction of a number of electric light plants in Nebraska and Oklahoma. Later he moved to Trenton, Mo., where, after rebuilding the gas and electric plants, he was appointed local manager for the holding company. He occupied this and other similar positions with the same company until moving to Kansas City in 1911. His first position there was with the electric light company, but later he was transferred to the railway company in charge of the metering equipment. He has since been connected with various departments and in different capacities, going into the general manager's office in May, 1924, as statistician.

Mr. Cloyd, was born in Hastings, Neb., on Aug. 26, 1883, and lived there until after finishing his education, which included a two-year university course in electrical engineering. He spent his vacations and other spare time while attending school working in a small foundry and machine shop, which, in addition to a general repair shop, manufactured a line of small electric motors.

### J. D. Cornell
Freight Traffic Manager

J. D. Cornell began his railroad work in 1890 in the car accountant's office of the Chicago, Burlington & Quincy Railroad at St. Joseph, Mo. From 1892 until 1900 he was employed in the accounting department of the St. Joseph & Grand Island Railway at St. Joseph. He went to Kansas City in 1900 and for seven years served in the general freight department of the Kansas City Southern. In 1907 he was selected to take charge of the compilation of tariffs for the Southwestern Tariff Committee at St. Louis, and he served in this capacity until 1910, when he became traffic manager of the Rock Island Southern Railway (Electric) at Davenport, Iowa.

During 1905 and for several years following Mr. Cornell served as traffic manager of the Joplin & Pittsburgh Railway and the Southwest Missouri Railway, electric interurban roads op-

erated in the metal mining district of Missouri. He has held the position of freight traffic manager at Kansas City for the last seven years.

### C. A. Kincade
Superintendent of Distribution

C. A. Kincade entered the service of the Metropolitan Street Railway, Kansas City, on May 22, 1900. His first work with this company was as a gripman on the old Twelfth Street cable line. In September, 1903, he was promoted to the position of assistant superintendent of the Twelfth Street division and as such his duties included the handling of trainmen and carhouse men as well as the work now taken care of by the timekeeper and cashier. Mr. Kincade was transferred to the electrical department in September, 1904. In 1905 he was appointed assistant to the electrical engineer. At that time his work included timekeeping and power despatching as well as clerical and general office work. Still in the capacity of assistant electrical engineer, in 1907 Mr. Kincade was placed in charge of all overhead and underground construction and maintenance work. At that time the power houses and substations were handled by his department.

In March, 1918, he was appointed superintendent of the electrical distribution department and he has handled those duties since then. On May 22 next Mr. Kincade will celebrate his twenty-eighth anniversary as an employee of this property.

Mr. Kincade was born and reared in Mason County, West Virginia. He removed to Kansas City in 1900.

### Howard W. Smith
Superintendent of Way and Structures

Howard W. Smith was employed in various capacities with road surveying parties in both the states of Michigan and Missouri from 1902 to 1906. In the latter year and until 1909 he was resident engineer in the construction of the Pacific Coast extension of the Chicago, Milwaukee & St. Paul in Dakota and Montana.

Mr. Smith was first employed by the street railways in Kansas City in 1911 as assistant engineer of the way and structures department and he has been in that department continuously since that date with the exception of four months in 1918 in war service. In 1916 he was appointed assistant superintendent of way and structures and served in that capacity until last October, when he was appointed superintendent of the department, reporting to R. W. Bailey.

Mr. Smith was born in Grand Rapids, Mich., in 1883 and lived there until 1903, when he moved to Kansas City.

### R. S. Neal
Superintendent of Equipment

R. S. Neal, superintendent of equipment, went to the Kansas City Railways on March 16, 1918, from the Kansas City Power & Light Company and was first employed in the way and structures department. Following several assignments in the engineering field, he returned to the Kansas City Railways on Nov. 12, 1920, to take charge of the engineering work for the mechanical department. He organized the engineering department, which includes all the designing work, making up of specifications, shop work plan and general drafting work. This position he held until April 1, 1922, when he was appointed assistant superintendent in charge of the mechanical department, reporting to R. W. Bailey.

J. A. Harder

L. M. Boschert

D. E. Druen

### Harry M. Smith
Assistant Superintendent of Transportation

Harry M. Smith entered the electric railway field as a despatcher with the Lorain & Cleveland Railway, Toledo, Ohio. This was not a big property and Mr. Smith, after several years of experience, was appointed auditor of the road, holding that position until it was merged with the Lake Shore Electric Railway, which operated between Cleveland and Toledo. Following the merger Mr. Smith was appointed chief train despatcher and later division superintendent. After six years with this property Mr. Smith was employed by J. M. Bramlette of the Michigan United Railways as interurban superintendent. This property operated in the city of Battle Creek, and from Jackson to Kalamazoo, a distance of about 70 miles. He held this position for seven years, when he resigned to accept an offer as superintendent of the Mexico Tramway in Mexico City, Mexico. He remained with this road for five years and then returned to the states and went direct to Chicago, serving for a year and a half as director of service for the Willys-Overland Company.

One day in Chicago Mr. Smith met his old friend J. M. Bramlette, who was then with the Lincoln Traction Company of Lincoln, Neb., and Mr. Bramlette prevailed upon him to return to the electric railway field as his superintendent of transportation. After three years at Lincoln, Mr. Smith went to Kansas City and in November, 1919, joined the organization as assistant superintendent of transportation, the same position he now holds.

Mr. Smith was born in Swanton, Ohio. He received his high school education in Toledo.

### I. R. Carson
Assistant Superintendent of Transportation

I. R. Carson went direct from a farm in Ellsworth County, Kansas, to Kansas City and a year or so later he entered the service of the Metropolitan Street Railway on May 30, 1906, as a motorman serving in that capacity until 1911, when he was made day office clerk. The next year he became the assistant division superintendent at Ninth and Washington and in 1913 was transfrred back to 48th and Harrison as assistant division superintendent under D. L. Fennell, who is now at the head of the entire transportation department.

In 1914 Mr. Carson was appointed superintendent of the Kansas City & Westport Belt Railway, a subsidiary of the old Metropolitan Street Railway. In 1915 he was transferred back to Ninth and Washington as division superintendent, where he remained until July 1, 1918, at which time he was placed in charge of work trains and freight service. Exactly a year later, on July 1, 1919, he was appointed assistant superintendent of transportation. He has held that position continuously since then. Mr. Carson was born in Brooklyn, N. Y.

## E. W. Holmes Promoted at Buffalo

Edward W. Holmes has been appointed assistant treasurer and assistant secretary of the International Railway and International Bus Corporation, the railway subsidiary, Buffalo, N. Y. Mr. Holmes brings to the post a wealth of transportation experience, having been engaged in the business for practically his entire career. In 1906 he became connected with the company as a clerk in the auditing department. Through successive promotions he became secretary to the president, at that time Thomas Penney. When Mr. Penney resigned in 1912, Mr. Holmes continued as secretary, as well as office manager of the legal department. From 1921 to 1924 he occupied the position of secretary to the International Railway voting trust, and continued there until his apointment to his new position.

E. G. Grimes is serving as division superintendent of the Union Traction Company at Marion, Ind. He joined the forces of this company in 1907, working on the Broad Ripple line for three years. He was then promoted to interurban conductor. When in the fall of 1917 C. S. Keever was appointed superintendent of transportation he appointed Mr. Grimes division superintendent at Fort Harrison. After this position was abolished Mr. Grimes was made instructor on all divisions and afterward was made freight claim investigator.

# Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

## Action on Fifteen Cars for San Francisco Expected

The public utilities committee of the Council of San Francisco, Cal., on April 15 postponed until its next meeting action on a recommendation by the Board of Public Works that $290,000 be set aside for the purchase of fifteen new cars for the projected Judah Street line of the Municipal Railway.

Completion of the line, in connection with the new Duboce tunnel, is partially contingent upon approval of proposed municipal line extensions at the coming bond issue election. It was said at the meeting, however, that the line might be completed out of the railway funds if the issue should not be approved by the voters. Investigation of this possibility was ordered before the next meeting.

It was explained that the cars should be ordered eight months in advance of the expected date of their need in order to insure delivery on time. Action on the matter is not expected to be longer delayed.

## Economic Trend to Be Discussed at Chamber of Commerce Meeting

President Coolidge and Secretary of Commerce Hoover will be among the speakers who will address the fifteenth annual meeting of the Chamber of Commerce of the United States to be held in Washington May 2 to 5. This national gathering of business leaders from all parts of the United States has been called to discuss the important economic changes that have taken place in the business life of the nation during the past few years. The discussions will center around the major topic "The New Business Era."

President Coolidge's talk will be delivered before a joint meeting of the national Chamber of Commerce and the Pan-American Commercial Conference. The latter conference will be attended by representatives from the Latin-American countries and will be held in Washington during the week of the meeting of the national chamber.

In many respects the meeting will be one of the most important ever held by the chamber. A statement says:

American business, sweeping forward under the play of new economic forces, finds it more necessary than ever to look into the future. What do changes that are taking place foretoken? How sharp is the break from the conditions before the war? In what direction are we headed? Are we approaching ever more important readjustments than we have seen in the recent past?

The new business era demands the careful weighing of many problems. It calls for study of complicated relationships. Trades and industries are entering new fields. Business units and conditions are changing. New points of contact with government and within commerce and industry are being developed.

Business is achieving so many new things even the best observers cannot keep abreast of them all. Industries are changing with new inventions and the application of new methods. Selling goods at home and abroad is bringing out new features of distribution.

The annual meeting of the national chamber will survey economic trends with the purpose of determining their meaning, with the hope of throwing light into the future. Leading business men will bring forward new problems within their industries. Newly arising questions that are bothering large sections of the country will be discussed.

## Simplified Invoice Drafted by U. S. Commerce Committee

Accompanied by an acceptance blank, the simplified invoice recently adopted by the joint committee of invoice simplification is being distributed by the Department of Commerce. The new invoice was unanimously chosen by the committee at a meeting held Feb. 16 and is the result of a series of meetings held during the past few months. The committee has given considerable study to the problems of the vendor and the customer, and it is of the opinion that all contingencies and the best features of both the uniform and the national standard have been taken care of in the form now circulated in the mails. In addition to the invoice set up as shown elsewhere on this page, the committee has circulated the following instructions:

To conform to standards:

"Customers' Use" block must be exactly as shown.

Designations must all be shown.

Sequence and position of designations must be as shown.

Sizes—8½ in. from side to side; 7, 11, and 14 in. from top to bottom.

Optional for user's convenience:

Size and arrangement of space for vendor's name, address, trademark, etc., may be changed as desired.

Spacing both horizontal and vertical to left of both Customers' Use block may be changed if desired.

"Ship To and Destination" may be arranged for window envelopes.

"Quantity," "Description," "Price," and "Amount" columns may be subdivided as desired.

Invoices for retailers should provide a column ⅞ in. wide to the right of the "Amount" columns and headed "For Retailer's Use."

Another note reads: "In case of multiple billing, provide columns here for order number. If not so used, this space may be added to the width of the other columns." The space indicated is at the left of that portion of the form used for detailing items. The committee also requests that the users of either standard or uniform forms adopt the simplified invoice form when the supply of their present forms is exhausted.

## D. H. Moore Promoted by Ohio Brass

David H. Moore, since 1925 electrical engineer and assistant to the secretary of the Ohio Brass Company, Mansfield, Ohio, has been appointed district sales manager of the company with headquarters at 50 Church Street, New York City. Mr. Moore's appointment took effect March 21. He will handle steam railroad accounts in parts of New York, New Jersey, Pennsylvania and the New England states.

Before going to the Ohio Brass Company Mr. Moore spent seven years with Day & Zimmermann, Inc., Philadelphia, in consulting and general engineering work. For eight years prior to that he was connected with the Schenectady and Pittsfield Works of the General Electric Company.

## Seattle's Mayor Wants Car Bonds Sold Locally

Mayor Bertha K. Landes of Seattle, Wash., has suggested that since the city has been unable to reach any agreement with the St. Louis Car Company in regard to its taking city bonds in payment for 80 new cars contracted for by the Municipal Railway the bonds be sold locally. She says this plan would speed up the purchase and enable the city to buy the cars at a lower figure.

The Mayor said that after conferring with representatives of the car company and St. Louis bankers she was convinced that a deadlock had been reached. The company is unwilling to take the bonds without a priority agreement in view of the litigation pending against the railway in the federal courts. The issue totals $1,420,000.

SIMPLIFIED INVOICE

[YOUR Name, Address and Trademark Go Here]

CUSTOMER'S ORDER NO. & DATE
REQUISITION NO.
CONTRACT NO.

REFER TO INVOICE NO.
INVOICE DATE
VENDOR'S NOS.

SOLD TO

SHIPPED TO AND DESTINATION
DATE SHIPPED
CAR INITIALS AND NO
HOW SHIPPED AND ROUTE
TERMS

FROM
F. O. B.

PREPAID OR COLLECT?

FOR CUSTOMER'S USE ONLY
REQUISITION NO. | VOUCHER NO.
F. O. B. CHECKED
TERMS APPROVED | PRICES APPROVED
CALCULATIONS CHECKED
TRANSPORTATION
FREIGHT BILL NO. | AMOUNT
MATERIAL RECEIVED
DATE ..19 | SIGNATURE | TITLE
SATISFACTORY AND APPROVED
ADJUSTMENTS
ACCOUNTING DISTRIBUTION
AUDITED | FINAL APPROVAL

QUANTITY | DESCRIPTION | UNIT PRICE | AMOUNT

New simplified invoice unanimously adopted by joint committee on invoice simplification

## Manhattan & Queens Railway Relocating Tracks

Work of relocating the track of the Manhattan & Queens Traction Corporation on Queens Boulevard, Borough of Queens, N. Y., has begun. The Eastern Construction Company, New York, is doing the work. It calls for relocating the tracks from Van Dam Street, Long Island City, through the communities of Winfield and Woodside to Fifty-sixth Avenue, Elmhurst, L. I.

At present, following the path of the old Queens Boulevard, the tracks of the railway alternate between the southbound and northbound side of the vehicular roadway. When the present work is completed and the old tracks removed those sections will be repaved and then two wide highways with one-way traffic on each will be available for motorists.

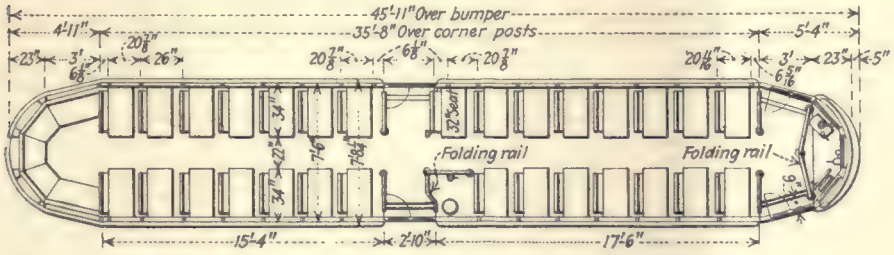
## Porto Rico Railway Gets Six New Two-Man Cars

Following are specifications of the six new two-man, single-end cars delivered on March 3 to the Porto Rico Railway, Light & Power Company, San Juan, Porto Rico, by the Perley A. Thomas Car Works of High Point, N. C.:

| | |
|---|---|
| Date order was placed | Oct. 14, 1926 |
| Date of delivery | March 3, 1927 |
| Type of car | Single-end, front-entrance, center exit, two-man |
| Weight: | |
| Car body | 14,500 lb. |
| Trucks | 8,278 lb. |
| Equipment | 6,222 lb. |
| Total | 29,000 lb. |
| Bolster centers, length | 26 ft. 0 in. |
| Length over all | 45 ft. 11 in. |
| Truck wheelbase | 5 ft. 2 in. |
| Width over all | 7 ft. 8¼ in. |
| Height, rail to trolley base | 10 ft. 7⅜ in. |
| Body | All steel |
| Interior trim | Mahogany |
| Headlining | Agasote |
| Roof | Arch |
| Air brakes | General Electric Co. |

Interior view near center door of new 65-passenger cars for the Porto Rico Railway, Light & Power Company

| | |
|---|---|
| Axles | Taylor Electric Truck Co. |
| Bumpers | Channel |
| Car trimmings | Thomas |
| Center and side bearings | Taylor Electric Truck Co. |
| Conduits and junction boxes | Duraduct |
| Control | General Electric K-75-A |
| Couplers | Car builder |
| Curtain fixtures | Curtain Supply Co. |
| Curtain material | Pantasote, double-faced |
| Destination signs | Hunter |
| Door operating mechanism | Car builder |
| Fare boxes | Johnson |
| Fenders | Consolidated |
| Finish | Duco |
| Gears and pinions | General Electric Co. |
| Hand brakes | National Brake Co. |
| Headlights | Electric Service Supplies Co. |
| Journal bearings | Taylor Elec. Truck Co. |
| Journal boxes | Taylor Elec. Truck Co. |
| Lightning arresters | General Electric Co. |
| Motors | G.E.264-A, inside hung |
| Sanders | Ohio Brass Co. |
| Seats | Heywood-Wakefield Co. |
| Seating material | Leather |
| Springs | Taylor Electric Truck Co. |
| Step treads | Kass |
| Trolley catchers | Ohio Brass Co. |
| Trolley base | General Electric Co. |
| Trucks | Taylor Electric Truck Co. |
| Wheels | Cast iron, 24 in. |




Commodious seating plan for cars

## Track Improvement Begun by East Chicago, Ind., Railway

Improvement of its right-of-way on Forsyth Avenue in East Chicago, Ind., from 150th Street to the northern city limits, a distance of about 3½ miles, is being made by the Hammond, Whiting & East Chicago Railway. The project includes realignment and paving of tracks over the entire route, according to Charles E. Lawrence, general manager.

At the request of property owners along Main Street, East Chicago, and the Board of Public Works, officials of the railway and of the Gary Railways are also considering plans to pave their right-of-way along that street. Due to the narrowness of the thoroughfare and the parking of automobiles along the curb, motorists are compelled to use the tracks. Property owners have asked the companies to pave the right-of-way in order to furnish a well-paved thoroughfare from curb to curb.

## Heavy Buying in the Copper Market

A large volume of copper buying after seven weeks of unusual dullness was the outstanding feature of the non-ferrous metals market for the week ended April 20. On this date the price seems to be fairly well established at 13½ cents delivered in Connecticut. Business in the other metals was only moderate and prices for lead and zinc are lower than a week ago. Antimony is quiet but firm, tin is quiet and steady and quicksilver is dull and easier. A further reduction in the price of platinum was made during the week, the market for all of the platinum group of metals being stagnant.

The issuance of March copper statistics showing a decided improved position in respect to stocks and current production started a buying wave April 13 that continued for five business days, reports *Engineering and Mining Journal*. The total volume of sales has been greater than the aggregate of the four preceding weekly periods and was exceeded by only one week since the first of the year. Deliveries have been specified principally for May and June, with a lesser quantity for prompt and

Typical exterior of steel car bodies built by the Perley A. Thomas Car Company for service in San Juan, P. R.

some as far ahead as July. In spite of the activity, it seems improbable, however, that the "Slack" created in the last seven weeks has been taken up, and sellers look for further buying in reasonable volume. Most of the Eastern business was placed at 13 cents until Monday, when all but two or three sellers increased their price to 13½ cents. A little 13-cent metal hung over until April 19, but on the day following 13½ cents appeared to be the bottom and some were talking of even higher prices. Foreign business has likewise been good and effective; April 20 the price of the export association increased to 13.50 cents c.i.f., the former figure being 13.35 cents. The f.a.s. market is quiet at about 13.20 cents. Domestic buying April 20 was quiet, but a breathing spell is to be expected. One large consumer took the attitude that he could afford to wait now until he sees whether the curtailment in output shown by the March figures will persist in April.

With no apparent curtailment in mine output in Joplin, a reduction in the ore price to $42 a ton, prime Western zinc, had eased during the week in a quiet market. Galvanizers are still backward buyers and on April 20 metal was available at from 6.30 cents to 6.325 cents. High grade is quoted at 8.25 cents delivered in New York and continues dull.

LEAD DOWN TO 7 CENTS, NEW YORK

Lead is indubitably weaker and no one seems to be optimistic as to the price trend in the immediate future. Sales in the last week have been of fair volume but current consumption is disappointing compared with last year and is almost certainly below the rate of production. Production, incidentally, shows no signs of declining in the March statistics, and without such curtailment there can be little hope of better prices. Mexican production, which it was supposed had been cut, actually showed a substantial gain.

METAL, COAL AND MATERIAL PRICES
F. O. B. REFINING

| **Metals—New York** | April 19, 1927 |
|---|---|
| Copper, electrolytic, cents per lb | 12.87 |
| Copper wire, cents per lb | 15.25 |
| Lead, cents per lb | 7.15 |
| Zinc, cents per lb | 6.71 |
| Tin, Straits, cents per lb | 68 625 |
| **Bituminous Coal, f.o.b. Mines** | |
| Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons | $4.325 |
| Somerset mine run, Boston, net tons | 1.925 |
| Pittsburgh mine run, Pittsburgh, net tons | 2.25 |
| Franklin, Ill., screenings, Chicago, net tons | 2.50 |
| Central, Ill., screenings, Chicago, net tons | 2.00 |
| Kansas screenings, Kansas City, net tons | 2.50 |
| **Materials** | |
| Rubber-covered wire, N. Y., No. 14, per 1,000 ft. | $5.50 |
| Weatherproof wire base, N. Y., cents per lb. | 16.75 |
| Cement, Chicago net prices, without bags | 2.05 |
| Linseed oil (5-bbl. lots), N. Y., cents per lb. | 11.2 |
| White lead in oil (100-lb. keg), N. Y., cents per lb | 14.50 |
| Turpentine (bbl. lots), N. Y., per gal | $0.66 |

On Monday, April 18, the American Smelting & Refining Co. reduced its contract price for New York lead from 7.25 cents to 7.15 cents. Reductions were also made by sellers in the Middle West from 6.90 cents, St. Louis basis, to 6.80 cents. Even at the reduced levels few buyers could be found, battery makers continuing out of the market. A little interest was shown by paint manufacturers, who report a good though seasonal improvement in their business; two or three days ago, for example, a fair sized order for corroding lead was placed at 7.05 cents, Chicago basis. Late this afternoon, a further reduction was made by the Smelting Co. to 7 cents, New York, practically no business having been done at the higher level.

TIN DROPS AFTER QUIET WEEK

The Easter holidays in London have interfered with the tin market, with the result that until April 20 prices showed little change, though sellers were firm. The marked drop in London on that date was unexpected in view of the rather strong tone here; it brought New York prices for prompt Straits to the neighborhood of 68 cents, with forward tin about 1½ cents less.

## Steel Castings 62 Per Cent of Shop Capacity

March bookings of steel castings, as reported to the Department of Commerce by the principal manufacturers, were 62 per cent of shop capacity, as against 69 per cent in February and 81 per cent a year ago. The production of steel castings was 73 per cent of capacity in March, as against 64 per cent in February and 83 per cent a year ago. The 123 reporting concerns have a present monthly capacity of 133,000 tons and represent over four-fifths of the commercial castings capacity of the United States, of which 60,100 tons are usually devoted to railroad specialties and 72,900 tons to miscellaneous castings.

## *Rolling Stock*

**Johnson City Traction Company, Johnson City, Tenn.,** is reported to have bought two new cars.

**Charleston Consolidated Railway & Lighting Company,** now a subsidiary of of the South Carolina Power Company, Charleston, S. C., will add nine new Birney safety cars to its equipment, according to a newspaper statement by Stuart M. Cooper, vice-president and general manager. Some of the cars have already been shipped and will probably be delivered shortly, it was stated.

**Evanston Railway, Evanston, Ill.,** according to press reports, will add six new street cars to the thirteen now in service in the city. The new cars, estimated to cost $12,000 each, will probably be put into service in the next two months.

## *Track and Line*

**Milwaukee Electric Railway & Light Company, Milwaukee, Wis.,** has started special track reconstruction work on East Wisconsin Avenue. Temporary rails have been laid along the curb so that service will not be interrupted.

**Municipal Railway, Seattle, Wash.,** will make two track extensions in the city if a recent recommendation of the city utilities committee is adopted. One extension is designed to reduce traffic congestion on University Way and the other to provide additional means of travel between Montlake and the University business district. The new work will cost $17,000 and will be paid for by sale of railway warrants.

**South Carolina Power Company, Charleston, S. C.,** is reported as spending $100,000 for new rails on several of its lines. Work is now being done on Meeting Street. Later operations will extend to King Street in Charleston.

**Kansas City Public Service Company, Kansas City, Mo.,** is reported to have begun work on laying temporary tracks from Nineteenth to 24th Streets on Southwest Boulevard, Kansas City. The new tracks and paving of the right-of-way are in advance of the paving of the boulevard. Bids on paving the boulevard received some time ago by Matthew S. Murray, director of public works, call for one of four constructions, a 3½-in. brick top, 3½-in. top of asphalting, 2-in. top of asphaltic concrete or Warrenite bitulithic on the present concrete base.

## *Shops and Buildings*

**Wisconsin Valley Electric Company, Wausau, Wis.,** recently broke ground for a new 96 x 185-ft. concrete and steel carhouse to be erected at First and De Kalb Streets, Wausau. The new structure, estimated to cost $42,000, will replace one twenty years old.

**Knoxville Power & Light Company, Knoxville, Tenn.,** according to a recent press report, will shortly occupy two additions which have been built to its carhouse located at the intersection of Magnolia Avenue and Jessamine Street in Park City. Brick, steel and concrete are being used in the construction of the carhouse and brick and concrete will be used in the garage addition. The additions will cost $12,000.

## *Trade Notes*

**Rome Wire Company, Rome, N. Y.,** has opened a new warehouse at 622 West Adams Street, Chicago, Ill. F. R. Weaver, district manager, is in charge.

**Billings & Spencer Company, Hartford, Conn.,** has transferred J. H. Coyle, formerly supervisor of engineering, to be directly in charge of sales engineering in New York, Pennsylvania and New England. His headquarters will be at Hartford.

**American Hammered Piston Ring Company, Baltimore, Md.,** has added H. W. Marshall to its sales force. Mr. Marshall's territory will include Kansas, Oklahoma, Arkansas and part of Missouri.

**United States Rubber Company, New York,** is responsible for a new publication, the *U. S. Tire Retailer*, of which Vol. 1, No. 1 appeared on March 1, 1927. E. F. Underhill is editor and Donald Fairbanks associate editor. The magazine is primarily designed to serve the tire dealers in the United States. Its size is 8½x12 in. Excellent illustrations and heavy glazed stock add to the attractiveness of the interesting text matter.

# No Air! Will your hand brakes hold?

In such emergencies it is imperative that they do hold or serious and possibly fatal accidents will occur.

In many instances in just such an emergency

## "Peacock" Staffless Brakes

Reg. U. S. Pat. Off.

The Peacock Staffless

have prevented serious accident. Even though chains are slack and brake shoes worn, they assure adequate braking at all times.

We will gladly send you facts and figures proving what these brakes have done for others and what they will do for your cars.

**National Brake Company, Inc.**

**890 Ellicott Square Buffalo, N. Y.**

*Canadian Representative:*

Lyman Tube & Supply Co., Ltd., Montreal, Can.

***Have you made this trial?***

1. Slack off the brake until full piston travel is required to set brake.
2. Release air brakes.
3. Then try to set hand brake!

***Will it hold?***

***The Peacock Staffless will!***

Type EAS

# Fit the Bond to the Job

## Type EAS

DIFFERENT operating conditions require specified types of rail bonds. High speed multiple unit trains, for instance, induce in the rails a peculiar vibration of high frequency. This taxes the endurance of any metal, eventually causing its destruction.

To meet this trying condition, we developed our Erico EAS Champion Rail Bond, pictured above.

Rope lay stranding, wires tightly interwoven, eliminates entirely transmission of rail vibration to any one strand. Yet the bond is extremely flexible.

The heavy copper sheath of Erico Champion terminals tightly binds the rope strands just beyond the zone of the weld. Thus vibration is almost completely dampened at this point.

## Type ET

AGAIN it is frequently necessary to bond rails where the joint is very loose. This condition necessitates a rail bond with a deep loop and one that is flexible. At the same time a permanent contact must be assured.

For this purpose we designed our type ET rail bond, illustrated below.

Terminals and conductors are made from a continuous copper strip which forms an unbroken copper path from rail to rail. The deep loop and flexible laminations especially fit this bond for use on loose joints.

In addition, it is particularly adaptable for application on the head of light tee, or girder rails. Also on the narrow ball, top or bottom, of a standard third or conductor rail.

***There is an Erico Rail Bond for every bonding need. Information about our complete line will be gladly furnished upon request.***

Type ET

**The Electric Railway Improvement Co.**

**2070 East 61st Place, Cleveland, Ohio**

*TWIN COACH" Powered with Two "Ricardo" Head Engines*

a-718-L

# Setting a New Standard

**As one of the foremost Bus designers in the World, it was fitting that the "TWIN COACH" should have been designed by Frank R. Fageol, father of the "SAFETY COACH." In selecting the engines, the following objectives were sought—simplicity of design, found only in an "Ell" head type engine—adequate power, for rapid acceleration in city work—yet economical enough to make profitable bus operation. That is why the "Ricardo" Head type of engine was chosen.**

*We are very proud to announce that after deciding on "Ricardo" Head Engines for his buses, Mr. Fageol, after carefully inspecting our extensive shop facilities, commissioned us to build the specially designed engines used in the "TWIN COACH." Waukesha Engines are also built in sizes varying from 20 to 130 H.P. and in four and six-cylinder types for Bus and Heavy Duty Truck work. All are equipped with "Ricardo" Heads which give more power per gallon of gasoline than any other type of engine and do it without "pinging." Let us send you an interesting booklet on "A Study in Heads."*

(A-726-L)

*AUTOMOTIVE EQUIPMENT DIVISION*

**WAUKESHA MOTOR COMPANY**

**Waukesha** **Wisconsin**

*Eastern Sales Offices* *Aeolian Building, 33 W. 42nd Street* *New York City*

*Exclusive Builders of Heavy Duty Automotive Type Engines for Over Twenty Years*

# PIN TERMINAL RAIL BONDS

*View of 20th Century rounding bend at Marblehead. The New York Central is always among the leaders in modern equipment. Insert shows our type CPO1 Bond used on all main line tracks*

BECAUSE of the ease of installation, Pin Terminal Rail Bonds are used on many of the larger railway systems. They are accessible for inspection, show low maintenance cost, insure strong contact and low resistance.

The American Steel and Wire Company has a rail bond for every requirement. Our engineers will be glad to assist you in selecting the best bond for your needs.

# American Steel & Wire Company

*Sales Offices:*

CHICAGO, NEW YORK, BOSTON, CLEVELAND, WORCESTER, PHILADELPHIA, PITTSBURGH, BUFFALO, DETROIT, CINCINNATI, BALTIMORE, WILKES-BARRE, ST. LOUIS, KANSAS CITY, ST. PAUL, OKLAHOMA CITY, BIRMINGHAM, MEMPHIS, DALLAS, ATLANTA, DENVER, SALT LAKE CITY

EXPORT REPRESENTATIVE: U. S. STEEL PRODUCTS CO., NEW YORK

PACIFIC COAST REPRESENTATIVE: U. S. STEEL PRODUCTS COMPANY, SAN FRANCISCO, LOS ANGELES, PORTLAND, SEATTLE.

# Answers!

to Questions appearing on page 15

1. A car which earns a maximum return on its investment by meeting all possible modern requirements.
2. Yes, because in addition to solving peak load traffic handling problems, it helps increase earnings.
3. N. P. Door and Step Control reduces standing time, thereby increasing car miles and car revenue, while reducing the number of accident claims and decreasing operating and maintenance expense.
4. Yes—by guarding against boarding and alighting accidents through automatic control.
5. Through rapid interchange of passengers, N. P. Door and Step Control materially increases schedule speed.
6. By reducing aisle friction and the crowding of entrances and exits.
7. By preventing slammed doors and other discourtesies.
8. Circulating load provides for simultaneous entrance through one door and exit through another, keeping passengers moving in one direction and reducing standing time and aisle friction.
9. By use of the N. P. Treadle Door which relieves the operator from his exit door controlling duties.
10. They are now being so operated with safety, speed and convenience in many different cities.

NATIONAL PNEUMATIC COMPANY

*Executive Office:* Graybar Building, New York

*General Works:* Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

# Economical to Build—Safe to Use

*Concrete bridge erected by the Southern Pacific Railway Company in Oregon. George W. Boschke Chief Engineer.*

ALONG the new 278-mile extension of the Southern Pacific Railway in Oregon are many portland cement concrete bridges similar to the one pictured above. The trestles are of concrete—the decks are made of *precast* concrete slabs.

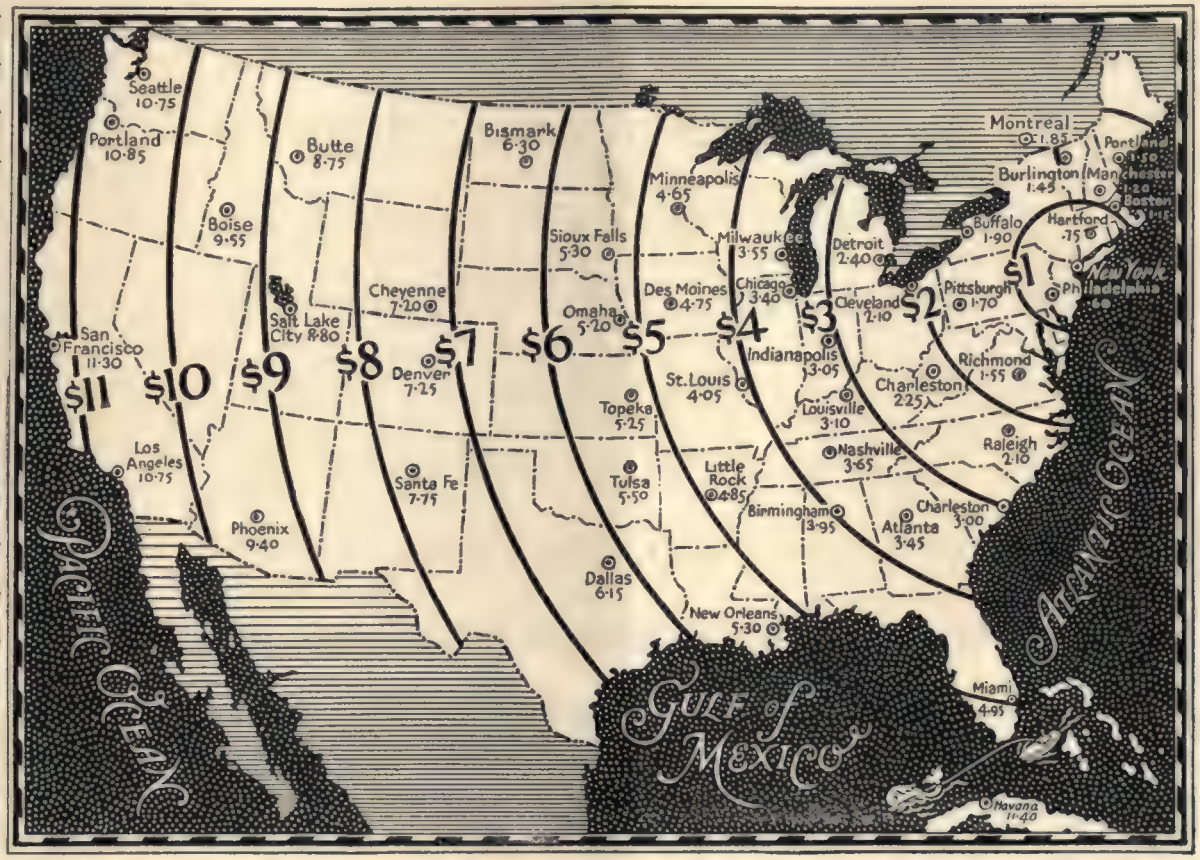
Precast concrete units, manufactured according to factory principles of production and quality control, are most economical and practical for bridges and other railway structures which are duplicated at several locations. They are firesafe, durable ,and flexible as to size and arrangement.

Portland cement concrete is coming into increasingly general use by railroads throughout the country.

PORTLAND CEMENT *Association*

*Concrete for Permanence* CHICAGO

# HOW FAR YOUR TELEPHONE DOLLARS WILL GO




## Typical station-to-station day rates

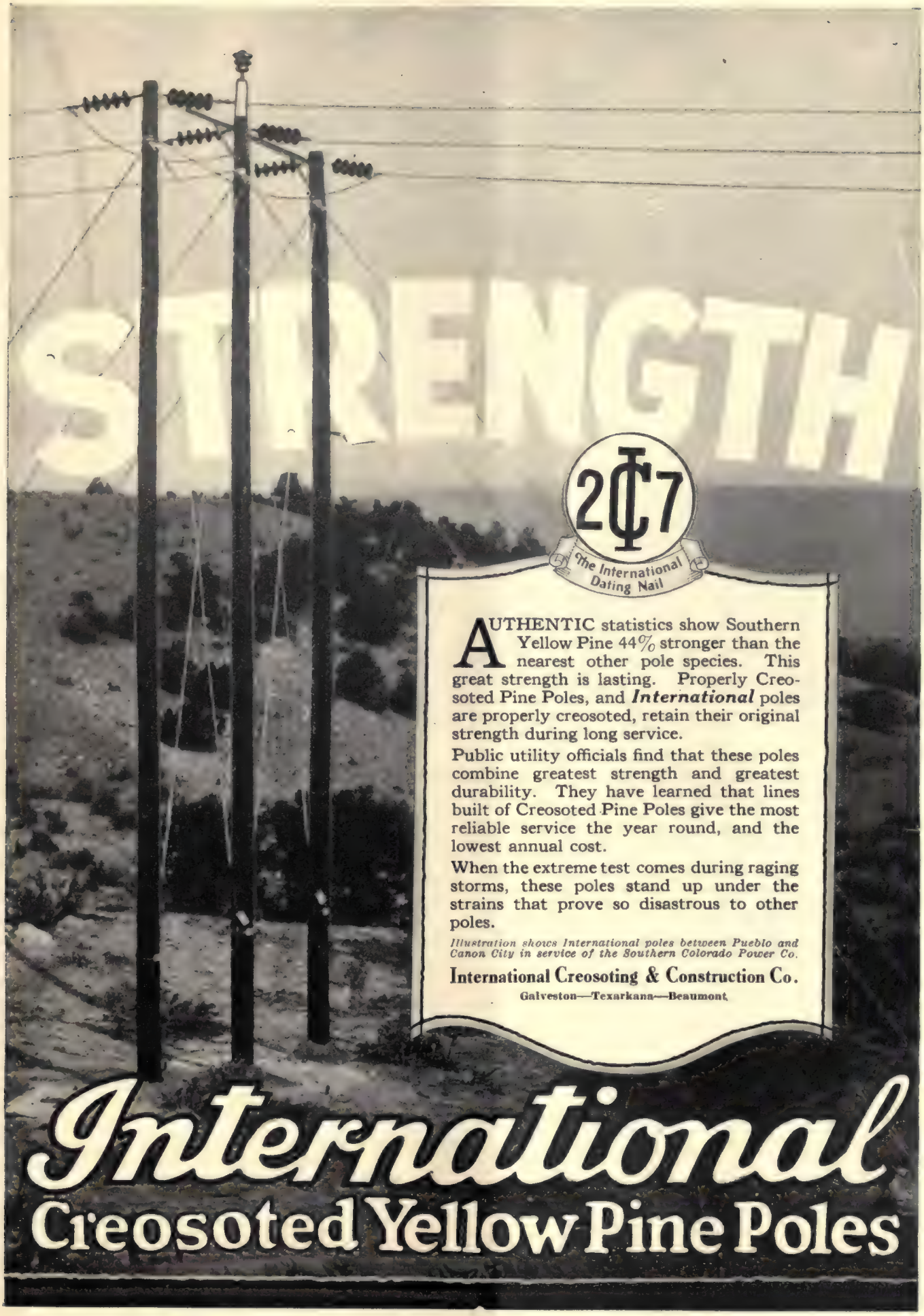
*Chicago to St. Louis, $1.45 Pittsburgh to New York, $1.70*
*Atlanta to San Francisco, $9.40 Denver to Indianapolis, $4.60*
*Cleveland to Omaha, $3.45 Boston to Detroit, $2.85*
*Seattle to Minneapolis, $6.45*

*What far away call should you make now.....number, please?.....*

# BELL LONG DISTANCE SERVICE

JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK


STRENGTH
2₵7
The International Dating Nail
AUTHENTIC statistics show Southern Yellow Pine 44% stronger than the nearest other pole species. This great strength is lasting. Properly Creosoted Pine Poles, and International poles are properly creosoted, retain their original strength during long service.
Public utility officials find that these poles combine greatest strength and greatest durability. They have learned that lines built of Creosoted Pine Poles give the most reliable service the year round, and the lowest annual cost.
When the extreme test comes during raging storms, these poles stand up under the strains that prove so disastrous to other poles.
Illustration shows International poles between Pueblo and Canon City in service of the Southern Colorado Power Co.
International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont
International
Creosoted Yellow Pine Poles

*Look at that tread! In the matter of traction as in other details of design, India Tires are far in the lead.*

## *ADD TO SERVICE— FINE APPEARANCE*

In the matter of appearance—on private or company cars—tires may add or detract.

India has always been a De Luxe tire—proud of its superiority and telling the world of its difference by means of the red stripe on the side-walls.

The jet black rubber, brilliant after rain, and the red stripe, have been identifying the cars of the rich and those who like rich things for years. India Tires add so much to the beauty of even the finest cars that plenty have willingly paid a premium to get them.

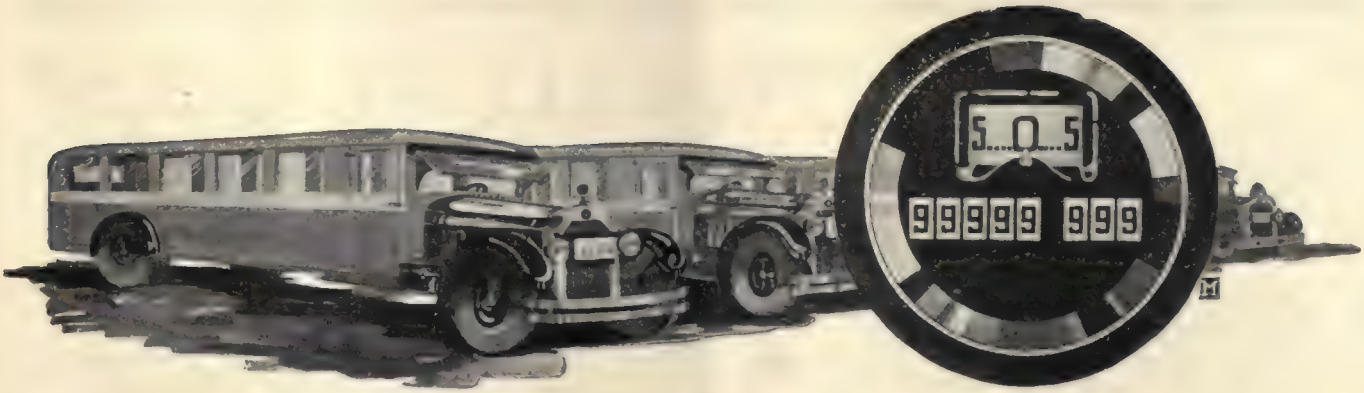
India users and dealers know that the difference in Indias is not all on the outside. They know about the 6-4 ply balloon construction—the ideal combination for comfort and long wear. They know about the True-Blue (HEAT-PROOF) Inner Tube which makes any tire give greater mileage. They know that for years nearly all the tires India could make were taken by bus and truck operators who demand the utmost of uninterrupted mileage.

"Fleet owners" must have best possible service first. Fine appearance is also a valuable asset.

Have one job equipped with Indias all 'round and you will quickly see how Indias give the best combination you can get.

# INDIA TIRES

INDIA TIRE & RUBBER CO. AKRON, OHIO



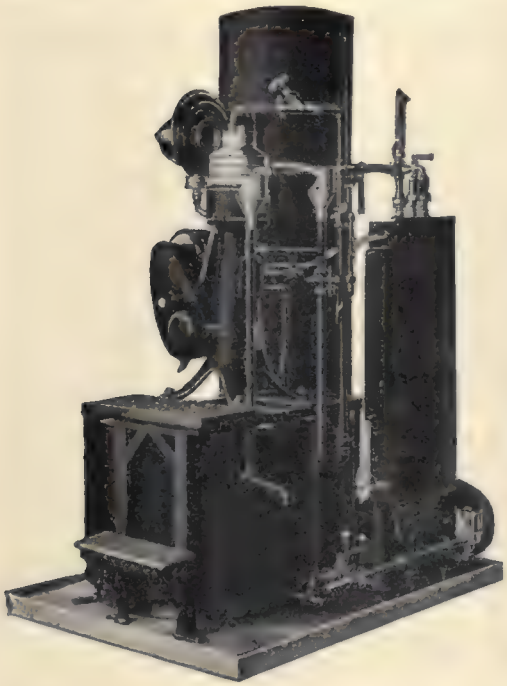

# Will your Speedometers Register the limit 5 times?

## *They can if your Motors are properly lubricated!*

Friction, the mortal enemy of motors, puts more automotive vehicles on the scrap heap than any other single cause. And friction, as any operator knows, is caused by poor lubrication.

Street railway systems operating fleets of buses or service trucks can easily insure for their units the kind of lubrication that will enable them to deliver thousands of miles of excess service.

Lubrication engineers and oil refiners state that *oil does not wear out!* It simply loses its ability to lubricate by becoming contaminated with road dust, carbon, water and gasoline. *Removal of these impurities provides a lubricant equal in every respect to new oil.* In fact, lubricating authorities state that properly purified oil is superior to new oil because the carbon forming elements are largely eliminated and carbon will not thereafter form so quickly.



The De Laval Crankcase Oil Reclaiming Outfit renews old oil—restores its viscosity—its ability to lubricate—enables you to change oil more frequently—at a cost of but *10 to 18 cents per gallon!*

Fleet owners who are using the De Laval have found that any handy man can operate it and that in a short time it pays for itself—the more so in the case of street railways as at little additional cost equipment can be added which will also enable the recovery of car axle oil.

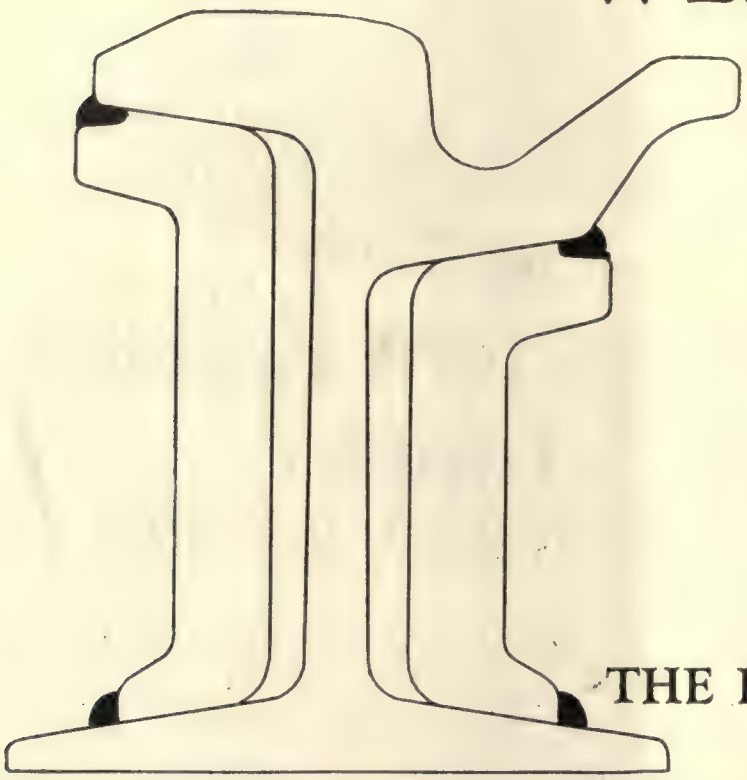
Write today for information showing how you can keep your buses and trucks on the road longer, asking particularly for Bulletin 108-R.

THE DE LAVAL SEPARATOR COMPANY
165 Broadway, New York — 600 Jackson Blvd., Chicago
DE LAVAL PACIFIC COMPANY, San Francisco
ALFA-LAVAL CO. Ltd., 34 Grosvenor Road, London, S. W. 1

# DE LAVAL

*Crankcase Oil Reclaiming Outfit*
*Car Axle Oil Reclaiming Equipment—Transformer Oil Purifiers*

# "WELD PLATES"



For EFFICIENT, ECONOMICAL

## JOINTS

Do you believe in statistics? Rely on performance records? If so the performance records of the many "Weld Plates" now in use will convince you that they lead the bar-weld joints in efficiency and economy.

"Weld Plates" represent the most modern welding practice. They are the strongest and most up-to-date plates rolled especially for electric welded joints. Note the shape—the grooves for retaining plenty of weld metal along the upper edges—the wide contact areas at top and bottom—the suitability for the use of short bolts.

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Armature Shafts

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*Write for Catalog 3J*

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Chilled Back of Flanges
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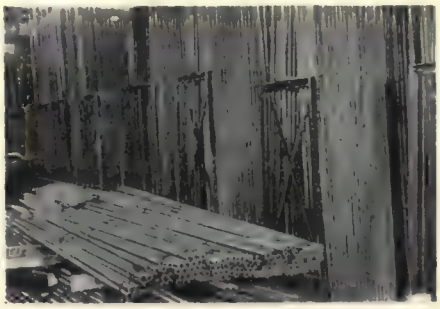
THE PUBLISHERS



# Do You Buy Repairs For Your Packard At the Five and Ten?



**Trolley Pole Stock in Nuttall Store Room**

Not on your life. You know that only Packard can turn out Packard cars and parts—you can't afford to take any chances.

But how about trolley parts and accessories? You should see some of the junk *we* see. Oh Man! soft, scrap brass trolley wheels, where the best of phosphor bronze is hardly good enough. Heavy, cast iron harps, where lightest malleable iron or forgings have their own troubles to stand the gaff.

Poles made of almost any kind of tubing, where heat treated steel, reinforced, carefully swedged and tapered is Nuttall Standard.

Springs!—well just springs, that's all. A spring is a spring, but the service requires the Nuttall Spring, designed to give the right tension, the right wheel contact pressure on the wire—oil tempered springs that *spring* and don't set.

**Trolley parts—run of mines stuff—actually cost you more money than genuine, guaranteed Nuttall parts. No substitute is ever as good. Ask the man with a glass eye.**

***Send for a Nuttall Catalog and Price List***

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1927

**R.D.NUTTALL COMPANY**
**PITTSBURGH PENNSYLVANIA**

**All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.**

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WRITE FOR OUR NEW DESCRIPTIVE CATALOG

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Engineers and Contractors SYRACUSE, N. Y.

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Better Quality Seats For Cars and Buses

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Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.

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RAIL BONDS-RAIL JOINTS
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WELDING ROD

UNA Welding & Bonding Co.
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*TOWERS — SUBSTATIONS*

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RAMAPO AUTOMATIC RETURN SWITCH STANDS FOR PASSING SIDINGS
TEE RAIL SPECIAL WORK
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SALES OFFICES AT ALL WORKS
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## National Railway Appliance Co.

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Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

*Catalog Sent on Request*

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NO OTHER metal for Trackwork inherently possesses the quality of automatically hardening itself on the surface under the wheel loads and at the same time preserving a tough background.

WM. WHARTON JR. & CO., INC.
EASTON, PA.

## Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.

THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

TULC A LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.
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Chicago Representatives: Jameson-Ross Company, Straus Bldg.

## Lorain Special Trackwork Girder Rails

*Electrically Welded Joints*

THE LORAIN STEEL COMPANY
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*Sales Offices:*
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*Pacific Coast Representative:*
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*Standard on 60 Railways for*

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Track Construction
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Differential Crane Car
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The American Appraisal Company

A National Organization

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FIRST-CLASS draftsman, familiar with steam and electric car truck design and manufacture. Answer stating age, experience and salary expected. P-988, Electric Railway Journal, Tenth Ave. at 36th Street, New York.

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AUDITOR, office manager, accountant, high class man of executive type, qualified by successful experience with large organizations; particularly trained in street railway work; available on short notice; correspondence invited. PW-985, Electric Railway Journal, 1600 Arch St., Philadelphia, Pa.

MASTER mechanic of character and ability, 20 years' experience on city and interurban property, desires to make a change for personal reasons. Best of references, correspondence solicited. PW-993, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

MAINTENANCE of equipment on buses, city and interurban electric cars. I have been very successful in showing low cost per mile with minimum number of car failures, desire for personal reasons to make a change, correspondence solicited, confidential. PW-990, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

### POSITIONS WANTED

Mr. MANAGER: If not satisfied with earnings, operating costs, efficiency and co-operation of employes, a reply to this advertisement will put you in touch with a superintendent of transportation with a proven record and broad experience, fully capable of getting results you desire. Fine references. Correspondence and interviews invited. PW-996, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

PRESENT manager of street railway property in Middle West operating 70 cars and 65 buses, desires change for personal reasons. Forty-five years of age. Twenty years' practical experience. Correspondence solicited. PW-987, Electric Railway Journal, Bell Telephone Building, St. Louis, Mo.

SUPERINTENDENT of railways with 20 years' experience, desires for personal reasons to make change. Nationwide reputation as railway operator, can take full charge. Has ability to handle men and show results. Correspondence invited and treated in confidence. PW-979, Electric Railway Journal, 7 South Dearborn Street, Chicago, Ill.

UTILITIES executive available. Engineering graduate, broad operating and executive experience, railway, also light and power. Young and progressive with tried and proven ability. Railway activities known to the industry. At present employed; seek opportunity with larger interests. The opportunity for past successful methods to produce relatively greater results. PW-972, Electric Railway Journal, Tenth Ave. at 36th St., New York.

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Graduate Electrical Engineer, at present employed with nationally known corporation, desires, for personal reasons, to make new connection.

Nine years' practical railway experience, and seven years' sales experience in electrical equipment. Particularly adapted to railway supply line. Age 36, married. Prefer New York or vicinity. Excellent references.

AS-994, Electric Railway Journal, Tenth Ave. at 36th St., New York City.

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**Brill Built**

**West. 508 or G. E. 264 Motors**

**Cars Complete—Low Price—Fine Condition**

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36—Westinghouse 306—CV-4 Motors.
100—G. E. 247 Motors.
100—Westinghouse 328 Motors.
40—K-35-G2 Controllers.

**IRVING S. VAN LOAN CORPORATION**
**1750 Broadway, New York City**
*Specialists in street cars or any part of a street car.*
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## Why Save Things You'll Never Use?

WHY let Mother Nature grow grass between the wheels of replaced cars? Why pile up rails, shop equipment, power plant equipment, line equipment, car appliances, road building material, etc., etc., you will never use again?

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6000 other electric railway men will see your advertisements of used or surplus equipment and materials here—in the Searchlight Section of their business paper.

Some of these men—officials or executives of other lines in other parts of the country and operating under different conditions—can use what you no longer need. For an insignificant investment you can tell these others what you have. And they will buy.

One "Searchlight" advertiser wrote, "We can cheerfully recommend the Searchlight Section as a wonderful medium for reaching buyers of rails and equipment." Another—"The strongest proof that your 'Searchlight' finds its way to many readers is shown by the numerous letters we have received in answer to our recent ad."

Let us tell you the cost of advertising your used or surplus equipment and materials in the Searchlight Section. Just address a list of what you have to dispose of to the

Searchlight Department
ELECTRIC RAILWAY JOURNAL
Tenth Ave. at 36th St., New York, N. Y.

# WHAT AND WHERE TO BUY

**Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue**

**Advertising, Street Car**
Collier, Inc., Barron G.

**Air Brakes**
Westinghouse Air Brake Co.

**Air Receivers & Aftercoolers**
Ingersoll-Rand Co.

**Anchors, Guy**
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M Co.

**Appraisals**
American Appraisal Co.

**Armature Shop Tools**
Columbia Machine Works
Elec. Service Supplies Co.

**Automatic Return Switch Stands**
Ramapo Ajax Corp.

**Automatic Safety Switch Stands**
Ramapo Ajax Corp.

**Axles**
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works
Westinghouse E. & M. Co.

**Axles, Front**
Shuler Axle Co.

**Axles, Steel**
Carnegie Steel Co.

**Babbitt Metal**
More-Jones Brass & Metal Co.

**Babbitting Devices**
Columbia Machine Works & M. I. Co.

**Badges and Buttons**
Elec. Service Supplies Co.
International Register Co.

**Batteries, Dry**
Nichols-Lintern Co.

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Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
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**Bearings, Center and Roller Side**
Cincinnati Car Co.
Columbia Machine Works
Stucki Co., A.

**Bearings, Roller**
Timken Roller Bearing Co.

**Bells and Buzzers**
Consolidated Car Heating Co.

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Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
St. Louis Car Co.

**Benders, Rail**
Railway Trackwork Co.

**Bodies, Bus**
Brill Co., The J. G

**Body Material, Haskelite and Plymetl**
Haskelite Mfg. Corp.

**Boilers**
Babcock & Wilcox Co.

**Bond Testers**
American Steel & Wire Co.
Electric Service Supplies Co.

**Bonding Apparatus**
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

**Bonds, Rail**
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Elec. Service Supplies Co.
Electric Railway Improvement Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)**
Bates Expanded Steel Truss Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

**Brake Adjusters**
Brill Co., The J. G
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

**Brake Shoes**
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

**Brake Testers**
National Ry. Appliance Co.

**Brakes, Brake Systems and Brake Parts**
Bemis Car Truck Co
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
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General Electric Co.
Jeandron, W. J.
LeCarbone Co.
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**Brushes, Wire Pneumatic**
Ingersoll-Rand Co.

**Brushholders**
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**Bulkheads**
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National Ry. Appliance Co.

**Bus Wheels, Steel**
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**Buses**
Brill Co., The J. G.
International Motor Co.
Mack Truck Co., Inc.
St. Louis Car Co.
Studebaker Corp. of America

**Bushings, Case Hardened and Manganese**
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
St. Louis Car Co.

**Cables (See Wires and Cables)**

**Cambric Tapes, Yellow and Black Varnish**
Irvington Varnish & Ins. Co.

**Carbon Brushes (See Brushes, Carbon)**

**Car Lighting Fixtures**
Elec. Service Supplies Co.

**Car Panel Safety Switches**
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

**Car Steps, Safety**
Cincinnati Car Co.

**Car Wheels, Rolled Steel**
Bethlehem Steel Co.

**Cars, Dump**
Brill Co., The J. G.
Differential Steel Car Co.
St. Louis Car Co.

**Cars, Gas-Electric**
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

**Cars, Gas, Rail**
Brill Co., The J. G.
St. Louis Car Co.

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Kuhlman Car Co., G. C.
Wason Mfg. Co.
St. Louis Car Co.

**Cars, Second Hand**
Electric Equipment Co.

**Cars, Self-Propelled**
Brill Co., The J. G.
General Electric Co.

**Castings, Brass Composition or Copper**
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**
American Steel Foundries
Bemis Car Track Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Standard Steel Works

**Castings, Malleable & Brass**
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers, Trolley**
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas N.

**Catenary Construction**
Archbold-Brady Co.

**Ceiling Car**
Haskelite Mfg. Corp.

**Ceilings, Plywood, Panels**
Haskelite Mfg. Corp.

**Cement Products**
Portland Cement Ass'n

**Change Carriers**
Cleveland Fare Box Co.
Electric Service Supplies Co.

**Change Trays**
Cincinnati Car Co.

**Circuit-Breakers**
General Electric Co.
Westinghouse E. & M. Co.

**Clamps and Connectors for Wires and Cables**
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

**Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)**
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
St. Louis Car Co.

**Clusters and Sockets**
General Electric Co

**Coil Banding and Winding Machines**
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

**Coils, Armature and Field**
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

**Coils, Choke and Kicking**
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

**Coin Counting Machines**
Cleveland Fare Box Co.
International Register Co.

**Coin Sorting Machines**
Cleveland Fare Box Co.

**Coin Wrappers**
Cleveland Fare Box Co.

**Commutator Slotters**
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

**Commutator Truing Devices**
General Electric Co.

**Commutators or Parts**
Cameron Electrical Mfg. Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

**Compressors, Air**
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr Br Co.

**Compressors, Air, Portable**
Ingersoll-Rand Co.

**Condensers**
General Electric Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

**Condensor Papers**
Irvington Varnish & Ins. Co.

**Connectors, Solderless**
Westinghouse E. & M. Co.

**Connectors, Trailer Car**
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

**Controllers or Parts**
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

**Controller Regulators**
Elec. Service Supplies Co.

**Controlling Systems**
General Electric Co
Westinghouse E. & M. Co.

**Converters, Rotary**
General Electric Co.
Westinghouse E. & M. Co.

**Copper Wire**
American Brass Co
American Steel & Wire Co.
Anaconda Copper Mining Co.

**Copper Wire Instruments, Measuring, Testing and Recording**
American Brass Co.
Anaconda Copper Mining Co.

**Cord, Bell, Trolley, Register**
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works

**Cord Connectors and Couplers**
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

**Couplers, Car**
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

**Cowl Ventilators**
Nichols-Lintern Co.

**Cranes, Hoists & Lifts**
Electric Service Supplies Co.

**Cross Arms (See Brackets)**

**Crossing Foundations**
International Steel Tie Co.

**Crossings**
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

**Crossings, Frogs & Switches**
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

**Crossings, Manganese**
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

**Crossings, Track (See Track Special Work)**

**Crossings, Trolley**
Ohio Brass Co.
Westinghouse E. & M. Co.

**Curtains & Curtain Fixtures**
Brill Co., The J. G.
St. Louis Car Co.

**Dealer's Machinery & Second Hand Equipment**
Electric Equipment Co.
Hyman-Michaels Co.
Van Loan Corp., Irving S.

**Derailing Devices (See also Track Work)**

**Derailing Switches**
Ramapo Ajax Corp.

**Destination Signs**
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.

**Detective Service**
Wish-Service, P. Edward

**Door Operating Devices**
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
National Pneumatic Co.
Safety Car Devices Co.

**Doors & Door Fixtures**
Brill Co., The J. G.
Cincinnati Car Co.
General Electric Co.
Hale-Kilburn Co.
St. Louis Car Co.

**Doors, Folding Vestibule**
National Pneumatic Co.
Safety Car Devices Co.

**Drills, Track**
American Steel & Wire Co.
Electric Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.

**Dryers, Sand**
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

**Ears**
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

**Electric Grinders**
Railway Trackwork Co.

**Electrical Wires and Cables**
Amer. Electrical Works.
American Steel & Wire Co.
John A. Roebling's Sons Co.

**Electrodes, Carbon**
Railway Trackwork Co.
Una Welding & Bonding Co.

**Electrodes, Steel**
Railway Trackwork Co.
Una Welding & Bonding Co.

**Engineers, Consulting, Contracting and Operating**
Archbold-Brady Co.
Beeler, John A.
Bibbins, J. Rowland
Buchanan & Layng Corp.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Kelly-Cooke Co.
Linn & Marshall Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster Co.
White Eng. Corp., The J. G.

**Engines, Gas, Oil or Steam**
Ingersoll-Rand Co.
Waukesha Motor Co.
Westinghouse E. & M. Co.

**Exterior Side Panels**
Haskelite Mfg. Corp.

**Fare Boxes**
Cleveland Fare Box Co.
Perey Mfg. Co.

**Fare Registers**
Electric Service Supplies Co.
Ohmer Fare Register Co.

**Fences, Woven Wire & Fence Posts**
Acme Wire Co.
American Steel & Wire Co.

**Fenders and Wheel Guards**
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.

**Fibre and Fibre Tubing**
Westinghouse E. & M. Co.

**Field Coils (See Coils)**

**Floodlights**
Electric Service Supplies Co.

**Floor, Sub**
Haskelite Mfg. Corp.

**Floors**
Haskelite Mfg. Corp.

**Forgings**
Brill Co., The J. G.
Cincinnati Car Co.
Duff Mfg. Co.
Standard Steel Works

**Frogs & Crossings, Tee Rail**
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

**Frogs, Track (See Track Work)**

**Frogs, Trolley**
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

**Fuses and Fuse Boxes**
Columbia Machine Works & M. I. Co.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.

**Fuses, Refillable**
General Electric Co.

**Gaskets**
Westinghouse Tr. Br. Co.

**Gas Producers**
Westinghouse E. & M. Co.

**Gates, Car**
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

**Gauges, Oil and Water**
Ohio Brass Co.

**Gear Blanks**
Brill Co., The J. G.
Standard Steel Works

**Gear Cases**
Chillingworth Mfg. Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co
Westinghouse E. & M. Co.

**Gears and Pinions**
Bemis Car Truck Co
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
R. D. Nuttall Co.

**Generating Sets, Gas-Electric**
General Electric Co.

**Generators**
General Electric Co.
Westinghouse E. & M. Co.

**Girder Rails**
Bethlehem Steel Co.
Lorain Steel Co.

**Gongs (See Bells and Gongs)**

**Greases (See Lubricants)**

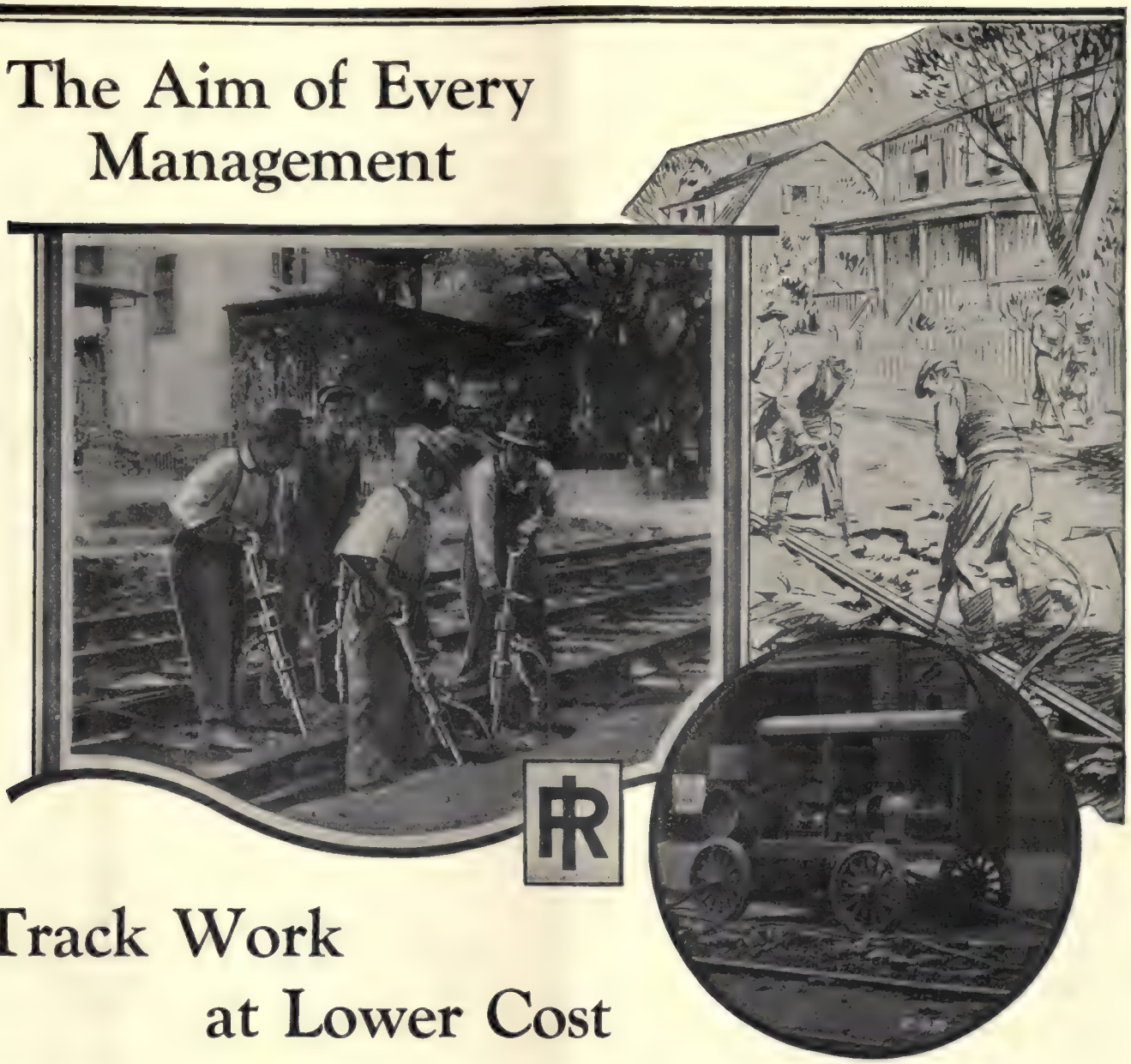
**Grinders, Portable**
Ingersoll-Rand Co.
Railway Trackwork Co.

**Grinders, Portable Electric**
Railway Trackwork Co.

**Grinding Bricks and Wheels**
Railway Trackwork Co.

(Continued on page 48)

# The Aim of Every Management



# Track Work at Lower Cost

Ingersoll-Rand Pneumatic Paving Breakers and Tie Tampers prove an effective means for reducing the time and labor costs of maintenance and reconstruction operations.

Two men with CC-Paving Breakers will break out more concrete than twelve to sixteen men using hand methods. Four men with Pneumatic Tie Tampers will tamp more track, and do a better job, than a dozen men with hand picks and bars.

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Ramapo Ajax Corp.
**Guard Rails, Tee Rail & Manganese**
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Wm. Wharton, Jr. & Co.
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Elec. Service Supplies Co.
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**Hammers, Pneumatic**
Ingersoll-Rand Co.
**Harps, Trolley**
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More-Jones Brass & Metal Co.
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Star Brass Works
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General Electric Co.
Ohio Brass Co.
St. Louis Car Co.
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Gold Car Heat. & Ltg. Co.
Smith Heater Co., Peter
**Heaters, Car, Hot Air and Water**
Smith Heater Co., Peter
**Heaters, Car Stove**
Smith Heater Co., Peter
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**Hose, Bridges**
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**Hose, Pneumatic**
Westinghouse Traction Brake Co.
**Instruments, Measuring, Testing and Recording**
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Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
U. S. Rubber Co.
Westinghouse E. & M. Co.
**Insulating Silk**
Irvington Varnish & Ins. Co.
**Insulating Varnishes**
Irvington Varnish & Ins. Co.
**Insulation (See also Paints)**
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
U. S. Rubber Co.
Westinghouse E. & M. Co.
**Insulation Slots**
Irvington Varnish & Ins. Co.
**Insulator Pins**
Elec. Service Supplies Co.
Hubbard & Co.
**Insulators (See also Line Materials)**
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Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
**Interior Side Linings**
Haskelite Mfg. Corp.
**Interurban Cars (See Cars)**
**Jacks (See also Cranes, Hoists and Lifts)**
Columbia Machine Works & M. I. Co.
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**Joints, Rail (See Rail Joints)**
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Cincinnati Car Co.
St. Louis Car Co.
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General Electric Co.
Westinghouse E. & M. Co.
**Lamps, Arc & Incandescent (See also Headlights)**
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Westinghouse E. & M. Co.
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Ohio Brass Co.
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Nichols-Lintern Co.
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Haskelite Mfg. Corp.
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Electric Service Supplies Co.
**Lightning Protection**
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
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Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
More-Jones Brass & Metal Corp.
Westinghouse E. & M. Co.
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General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.
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Ingersoll-Rand Co.
**Lubricating Engineers**
Universal Lubricating Co.
**Lubricants, Oil and Grease**
Universal Lubricating Co.
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**Manganese Steel Guard Rails**
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co.
**Manganese Steel, Special Track Work**
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.
**Manganese Steel Switches, Frogs and Crossings**
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
**Meters (See Instruments)**
**Mirrors, Inside & Outside**
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**Motor and Generator Sets**
General Electric Co.
**Motor Buses (See Buses)**
**Motors, Electric**
General Electric Co.
Westinghouse E. & M. Co.
**Motorman's Seats**
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
St. Louis Car Co.
Wood Co., Chas. N.
**Nuts and Bolts**
Bemis Car Truck Co.
Cincinnati Car Co.
Hubbard & Co.
**Oil Purifiers**
De Laval Separator Co.
**Oils (See Lubricants)**
**Omnibuses (See Buses)**
**Oxygen**
International Oxygen Co.
**Packing**
U. S. Rubber Co.
Westinghouse Traction Brake Co.
**Paints and Varnishes (Insulating)**
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.
**Paints & Varnishes, Railway**
National Ry. Appliance Co.
**Panels, Outside, Inside**
Haskelite Mfg. Corp.
**Pavement Breakers**
Ingersoll-Rand Co.
**Pickup, Trolley Wire**
Elec. Service Supplies Co.
Ohio Brass Co.
**Pinion Pullers**
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.
**Pinions (See Gears)**
**Pins, Case Hardened, Wood and Iron**
Ohio Brass Co.
Westinghouse Traction Brake Co.
**Pipe Fittings**
Standard Steel Works
Westinghouse Tr. Brake Co.
**Planers (See Machine Tools)**
**Plates for Tee Rail Switches**
Ramapo Ajax Corp.
**Pliers, Rubber Insulated**
Elec. Service Supplies Co.
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Haskelite Mfg. Corp.
**Pneumatic Tools**
Ingersoll-Rand Co.
**Pole Line Hardware**
Bethlehem Steel Co.
Elec. Service Supplies Co.
Ohio Brass Co.
**Pole Reinforcing**
Hubbard & Co.
**Poles, Metal Street**
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.
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Bell Lumber Co.
International Creosoting & Const. Co.
**Poles, Ties, Posts, Piling & Lumber**
International Creosoting & Const. Co.
Naugle Pole & Tie Co.
**Poles, Trolley**
Elec. Service Supplies Co.
R. D. Nuttall Co.
**Poles, Tubular Steel**
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
**Potheads**
Okonite Co.
Okonite-Callender Cable Co., Inc.
**Power Saving Devices**
National Ry. Appliance Co.
**Pressings, Special Steel**
Cincinnati Car Co.
**Pressure Regulators**
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.
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Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks.)
**Pumps, Vacuum**
Ingersoll-Rand Co.
**Punches, Ticket**
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Wood Co., Chas. N.
**Rail Braces and Fastenings**
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**Rail Grinders (See Grinders)**
**Rail Joints**
Carnegie Steel Co.
Rail Joint Co.
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Lorain Steel Co.
Metal & Thermit Corp.
**Rail Welding**
Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.
**Rails, Steel**
Carnegie Steel Co.
**Railway Safety Switches**
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
**Rattan**
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Elec. Service Supplies Co.
Hale-Kilburn Co.
St. Louis Car Co.
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Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.
St. Louis Car Co.
**Reinforcement, Concrete**
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Bethlehem Steel Co.
Carnegie Steel Co.
**Repair Shop Appliances (See also Coil Banding and Winding Machines)**
Elec. Service Supplies Co.
**Repair Work (See also Coils)**
General Electric Co.
Westinghouse E. & M. Co.
**Replacers, Car**
Cincinnati Car Co.
Elec. Service Supplies Co.
**Resistances**
Consolidated Car Heating Co.
**Resistance, Wire and Tube**
General Electric Co.
Westinghouse E. & M. Co.
**Retrievers, Trolley (See Catchers and Retrievers Trolley)**
**Rheostats**
General Electric Co.
Westinghouse E. & M. Co.
**Roofing, Car**
Haskelite Mfg. Corp.
**Roofs, Car and Bus**
Haskelite Mfg. Corp.
**Rubber Specialties of All Kinds**
U. S. Rubber Co.
**Safety Control Devices**
Safety Car Devices Co.
**Sanders, Track**
Brill Co., The J. G.
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.
**Sash Fixtures, Car**
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
**Sash, Metal Car Window**
Hale-Kilburn Co.
**Scrapers, Track (See Cleaners and Scrapers, Track)**
**Screw Drivers, Rubber Insulated**
Elec. Service Supplies Co.
**Seating Materials**
Brill Co., The J. G.
Haskelite Mfg. Corp.
St. Louis Car Co.
**Seats, Bus**
Brill Co., The J. G.
Hale-Kilburn Co.
St. Louis Car Co.
**Seats, Car (See also Rattan)**
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
St. Louis Car Co.
**Second Hand Equipment**
Hyman-Michaels Co.
Van Loan Corp., Irving S.
**Shades, Vestibule**
Brill Co., The J. G.
Cincinnati Car Co.
**Shovels**
Brill Co., The J. G.
Hubbard & Co.
**Shovels, Power**
Brill Co., The J. G.
**Side Bearings (See Bearings Center and Side)**
**Signals, Car Starting**
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Elec. Service Supplies Co.
National Pneumatic Co.
**Signals, Indicating**
Nichols-Lintern Co.
**Signal Systems, Block**
Elec. Service Supplies Co.
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.
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Nachod and United States Electric Signal Co.
Wood Co., Chas. N.
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**Sleet Wheels and Cutters**
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Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.
R. D. Nuttall Co.
**Smokestacks, Car**
Nichols-Lintern Co.
**Snow Plows**
National Ry. Appliance Co.
**Snow-Plows, Sweepers and Brooms**
Brill Co., The J. G.
Columbia Machine Works & M. I. Co.
Consolidated Car Fender Co.
St. Louis Car Co.
**Snow Sweeper, Rattan**
J. G. Brill Co.
**Soldering and Brazing Apparatus (See Welding Processes and Apparatus)**
**Spacer, Tie**
Duff Mfg. Co.
**Special Adhesive Papers**
Irvington Varnish & Ins. Co.
**Special Trackwork**
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Lorain Steel Co.
Wm. Wharton, Jr. & Co.
**Spikes**
American Steel & Wire Co.
**Splicing Compounds**
U. S. Rubber Co.
Westinghouse E. & M. Co.
**Splicing Sleeves (See Clamps and Connectors)**
**Springs**
National Ry. Appliance Co.
**Springs, Car and Truck**
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works
**Sprinklers, Track and Road**
Brill Co., The J. G.
St. Louis Car Co.
**Steel and Steel Products**
American Steel & Wire Co.
Carnegie Steel Co.
**Steps, Car**
Brill Co., The J. G.
Cincinnati Car Co.
**Stokers, Mechanical**
Babcock & Wilcox Co.
Westinghouse E. & M. Co.
**Stop Signals**
Nichols-Lintern Co.
**Storage Batteries (See Batteries, Storage)**
**Storage Tanks**
S. F. Bowser Co.
**Strain Insulators**
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
**Strand**
American Steel & Wire Co.
Roebling's Sons Co., J. A.
**Street Cars (See Cars, Passenger, Freight, Express)**
**Superheaters**
Babcock & Wilcox Co.
**Sweepers, Snow (See Snow Plows, Sweepers and Brooms)**
**Switch Stands and Fixtures**
Ramapo-Ajax Corp.
**Switches, Selector**
Nichols-Lintern Co.
**Switches and Switchboards**
Consolidated Car Heating Co.
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
**Switches, Tee Rail**
Ramapo-Ajax Corp.
**Switches, Track (See Track Special Work**
**Tampers, Tie**
Ingersoll-Rand Co.
Railway Trackwork Co.
**Tapes and Cloths (See Insulating Cloth, Paper and Tape)**
**Tee Rail Special Track Work**
Ramapo-Ajax Corp.
**Telephones and Parts**
Elec. Service Supplies Co.
**Telephone & Telegraph Wire**
American Steel & Wire Co
American Telephone &
**Testing Instruments (See Measuring, Testing, etc.)**
**Thermostats**
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Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter
**Ticket Choppers and Destroyers**
Elec. Service Supplies Co.
**Ties and Tie Rods, Steel**
Carnegie Steel Co.
International Steel Tie Co.
**Ties, Wood Cross (See Poles, Ties, Posts, etc.)**
Telegraph Co.
**Tires**
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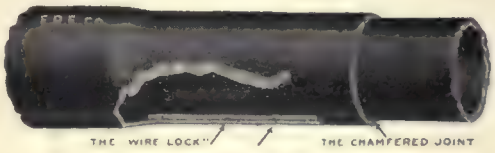


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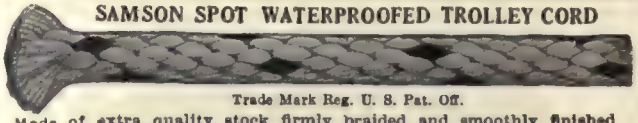

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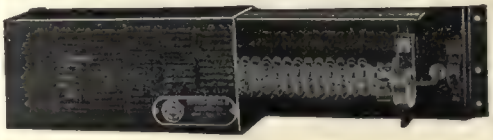

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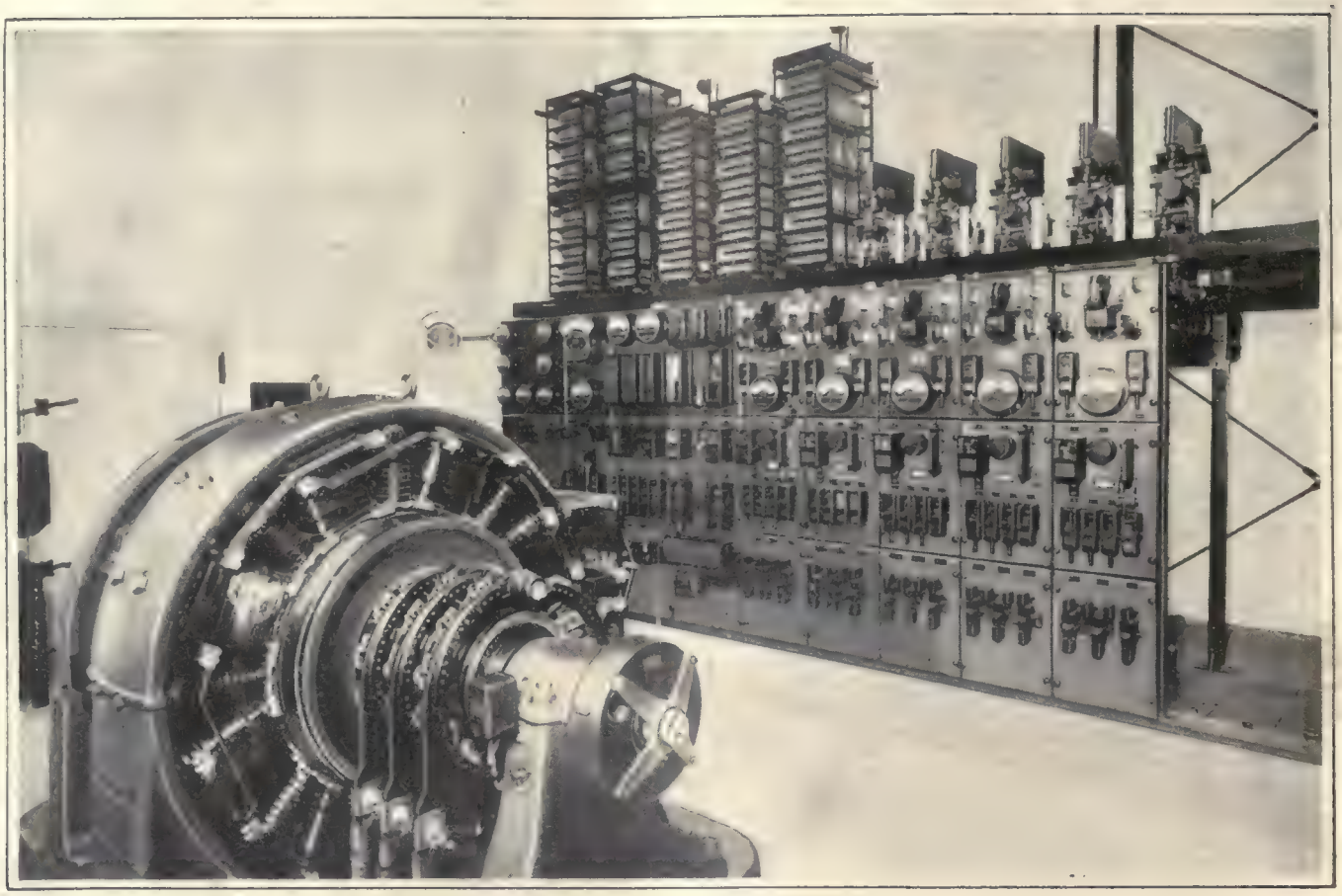

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The Los Angeles Railway has incorporated in its automatic substations the latest methods and equipment. These stations are made virtually soundproof, have air cleansers to minimize troubles caused by dust accumulation, and utilize forced air for both ventilation and cooling.

**Operating Charges of Automatic Substations, Los Angeles Railway**

Monthly Average per 1,000 kw. Capacity

| Year | Repairs to Equipment | | Labor of Operators | | Supplies | |
|---|---|---|---|---|---|---|
| | Automatic | Manual | Automatic | Manual | Automatic | Manual |
| 1922 | $ 9.94 | $52.77 | $83.16 | $277.14 | $16.07 | $ 8.35 |
| 1923 | 1.73 | 36.22 | 78.17 | 226.75 | 4.91 | 9 37 |
| 1924 | 5.75 | 60.24 | 79.80 | 247.76 | 11.13 | 15.02 |
| 1925 | 17.83 | 106.67 | 80 55 | 221.74 | 11.33 | 8.24 |
| 1926 | 20.72 | 61.99 | 83.89 | 220.80 | 12.68 | 8.86 |

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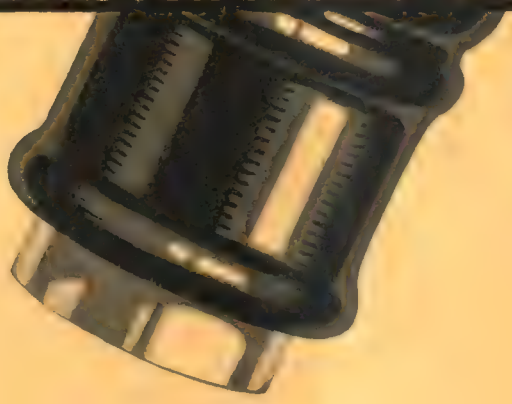

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## *"Stuck by Floods"*

IN THIS ISSUE is a report of the Southwestern Public Service Association meeting at New Orleans—and thereby hangs a tale.

An editor of the JOURNAL'S staff left Chicago for an extended trip through the Southwest. On his itinerary was the meeting of the Southwestern Association at New Orleans, which opened on April 26. But in the territory through which he traveled—the Great Mississippi Valley—the "Father of Waters" impatiently threw aside the puny restraining hand of man and ran rampant over rail lines and highways. "Stuck by floods" flashed a cryptic message to New York. "Changing itinerary; can't make New Orleans in time for meeting."

But the meeting was covered and the report is in this issue. A hasty shift in plans, a ticket purchased, a bag packed and an editor was on his way from New York. A flood of the Mississippi is only and incident in the job of reporting a meeting to JOURNAL readers—while it's still news!

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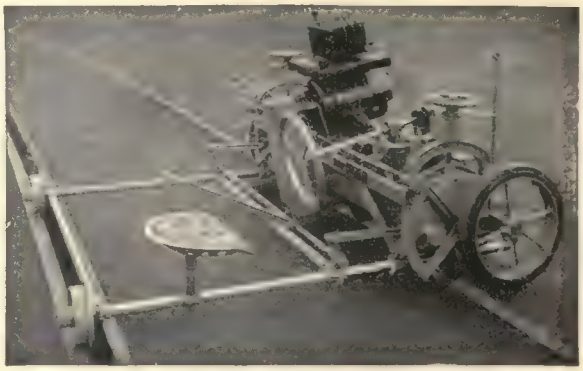
SAVING THE RAIL SAVES THE RAILWAY

# Making a little go a long way



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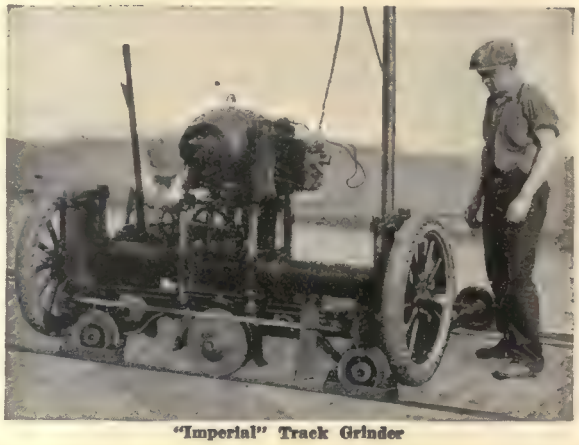
The track was badly run down. We quote from an article in this paper:

> "The relative needs of track and rolling stock were weighed and it was decided that the track was so far gone that immediate and drastic steps would have to be taken to repair some of the worst stretches. Money was not available for giving necessary attention to both of these items and since even new cars operating over impossible track would be of little avail the latter was given priority. . . . . ."



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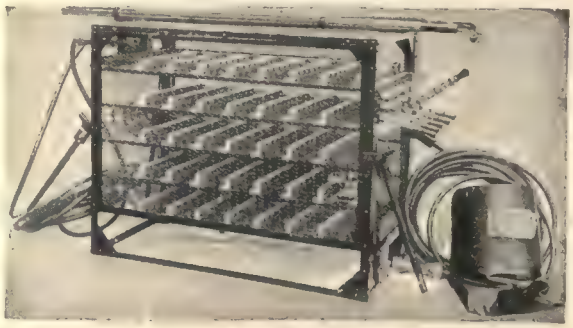

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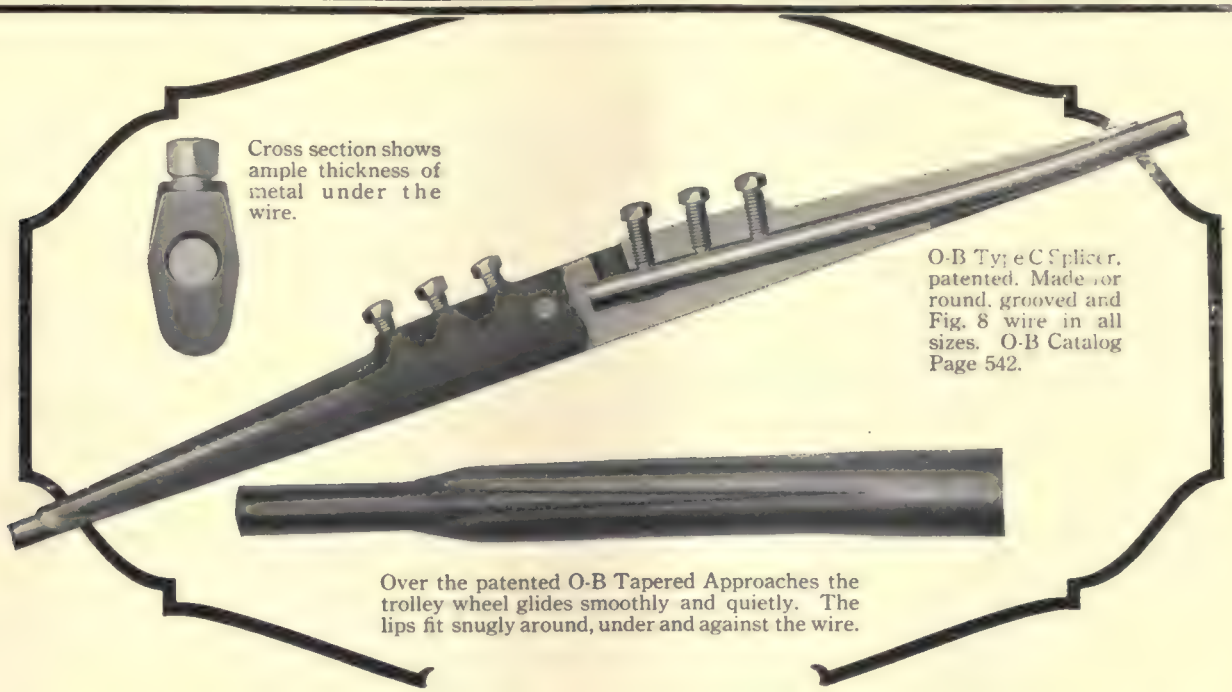


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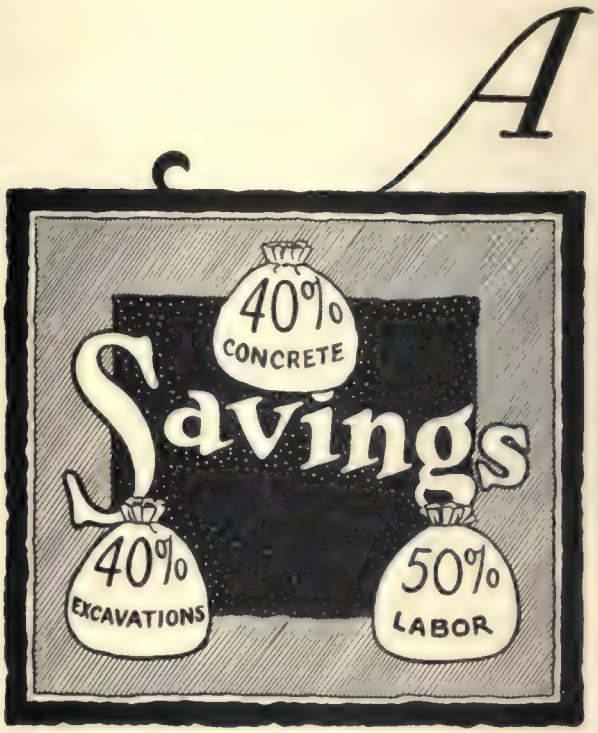


# A 40% *reduction*

## in concrete and excavation items *has a radical effect* on the *completed track costs*

And when you consider that these two items usually make up 82 per cent of the total cost of track—you can readily appreciate the fact that Twin Tie track construction means better track with low first cost.

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A comparative estimate against your present construction may show a substantial saving—We repeat "a 40% reduction in concrete and excavation items has a radical effect on the completed track costs."

*International Steel Tie Co.*
*Cleveland, Ohio*

*Look it up in your "Paved Track Note Book"*

# Steel Twin Tie Track

# A New Line

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May we send you a copy of this publication?

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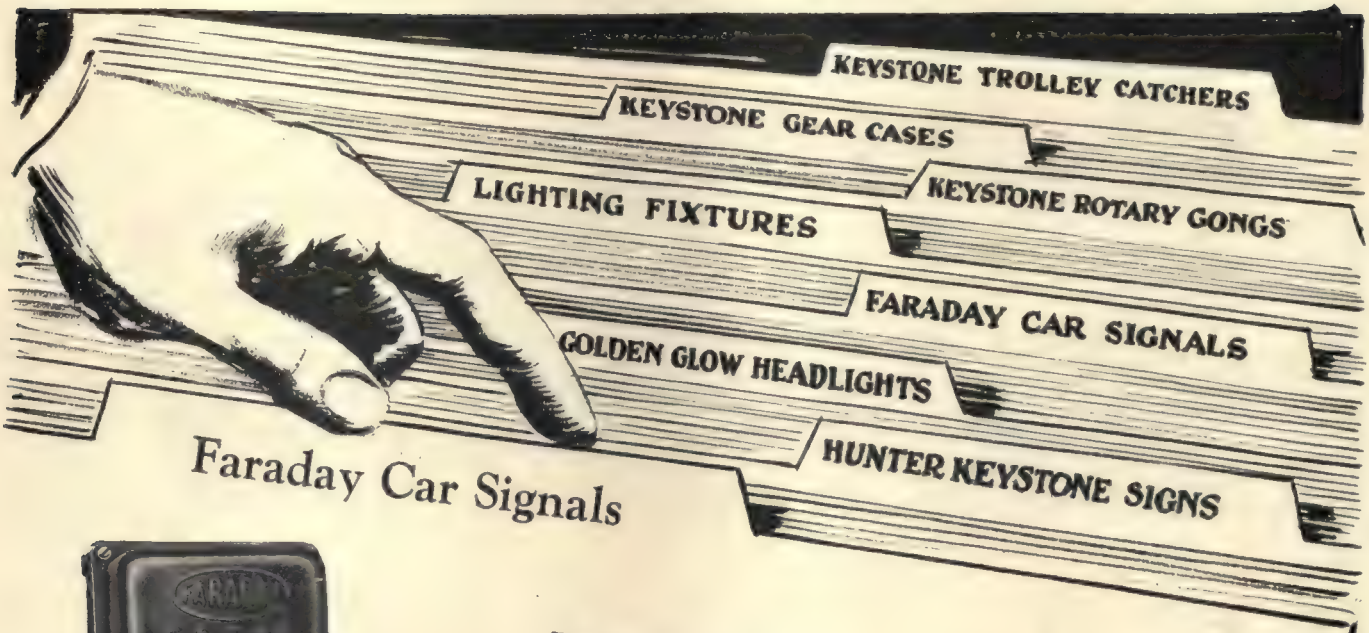
# *Air Compressors*

"QUALITY MACHINES FOR QUALITY SERVICE"




# Faraday Car Signals

To increase patronage, add attractiveness and efficiency to your cars by selecting your equipment from the broad line of Keystone Car Specialties.

## Faraday Car Signals

The installation of these reliable and convenient passenger signal systems enables passengers to signal the operator without commotion and distraction of his attention. Made for every requirement—high or low voltage systems, buzzers, vibrating bells or single-stroke bells, resistance panels, flush or surface type push buttons. A convenience your passengers appreciate.

*Catalog No. 7 describes and illustrates the complete line of Keystone Equipment. Sent on request.*

# ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Illinois Merchants' Bank Bldg.

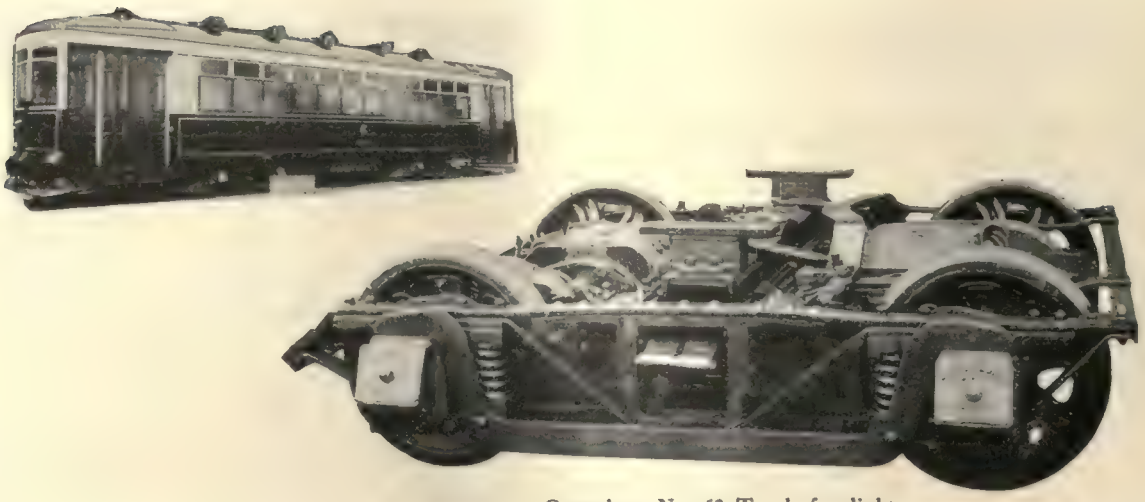
PITTSBURGH
1123 Bessemer Building

BOSTON
88 Broad Street

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver



Cummings No. 62 Truck for light weight city and interurban cars.

# Modern Car Design *includes a smooth riding* Truck

Cars recently built by this company for several properties have brought forth much favorable comment from the public in the various localities. The riding comfort has been especially noted. This is a feature of the modern car that goes far to increase good will and build patronage. Cummings No. 62 Truck, shown above, has contributed largely to the riding comfort of our cars.

CUMMINGS CAR AND COACH COMPANY

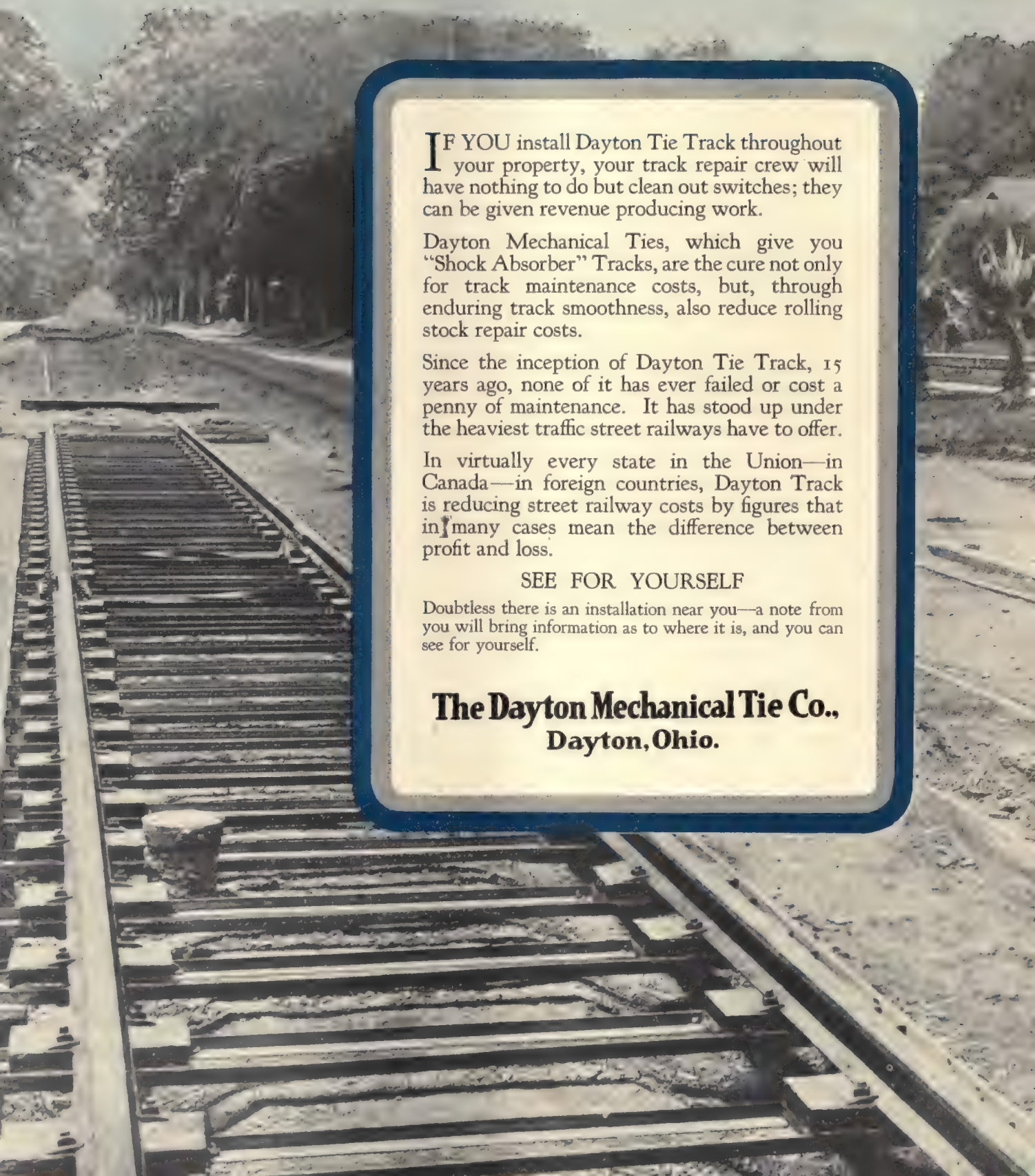
*Successors to McGuire-Cummings Mfg. Co.*

111 W. Monroe Street, Chicago, Ill.

# Put the Track Repair Crew on Productive Work

**The Dayton Mechanical Tie Co.,**
**Dayton, Ohio**

# Dayton Tie Track doesn't need a repair crew



IF YOU install Dayton Tie Track throughout your property, your track repair crew will have nothing to do but clean out switches; they can be given revenue producing work.

Dayton Mechanical Ties, which give you "Shock Absorber" Tracks, are the cure not only for track maintenance costs, but, through enduring track smoothness, also reduce rolling stock repair costs.

Since the inception of Dayton Tie Track, 15 years ago, none of it has ever failed or cost a penny of maintenance. It has stood up under the heaviest traffic street railways have to offer.

In virtually every state in the Union—in Canada—in foreign countries, Dayton Track is reducing street railway costs by figures that in many cases mean the difference between profit and loss.

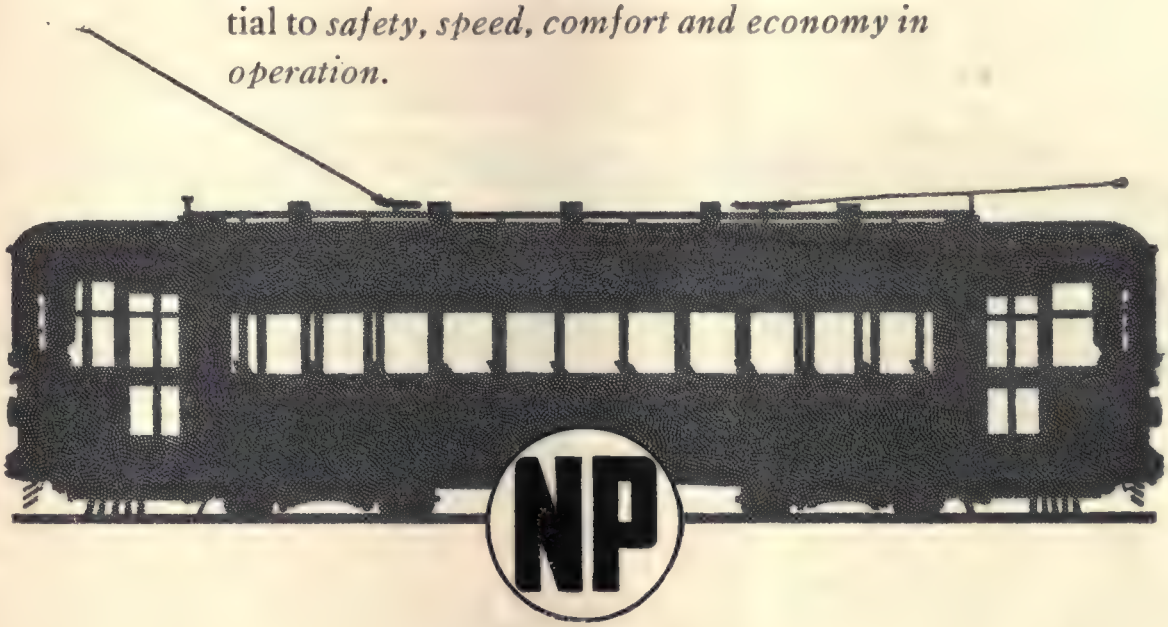
SEE FOR YOURSELF

Doubtless there is an installation near you—a note from you will bring information as to where it is, and you can see for yourself.

**The Dayton Mechanical Tie Co.,**
**Dayton, Ohio.**

# THE MODERN CAR

A modern car is a car that is completely equipped with every practical device essential to *safety, speed, comfort and economy in operation.*




N. P. Door and Step Equipment is not only an essential in each of these respects but, by cutting down standing time and reducing aisle friction and other peak load problems to a minimum, it makes it possible to utilize the full efficiency of all other mechanisms and devices on the car.

NATIONAL PNEUMATIC COMPANY

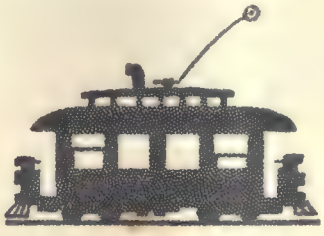
*Executive Office:* Graybar Building, New York

*General Works:* Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building



# "Absolutely sold on

# Cincinnati New Cars"

So says Mr. Kington of the Knoxville Power & Light Company, Knoxville, Tennessee. This company operates 30 Cincinnati Lightweight NEW cars—23 of the single truck type and 7 of the double truck type. Mr. Kington emphasized especially the comfort of these cars, and their quick acceleration and deceleration.

Again, from a successful operator, comes appreciation of the practical results of BALANCED DESIGN—better service more easily maintained; public appreciation of greater comfort and convenience; substantial savings in power and maintenance.

It has taken ten years of consistent effort on our part to achieve this standard of modern car-building. But now that it is established it means that the results which have followed the use of Cincinnati Lightweight NEW Cars on successfully modernized roads throughout the country can be duplicated with every reasonable certainty on YOUR property.

Let us sit down with you and discuss the subject in detail.

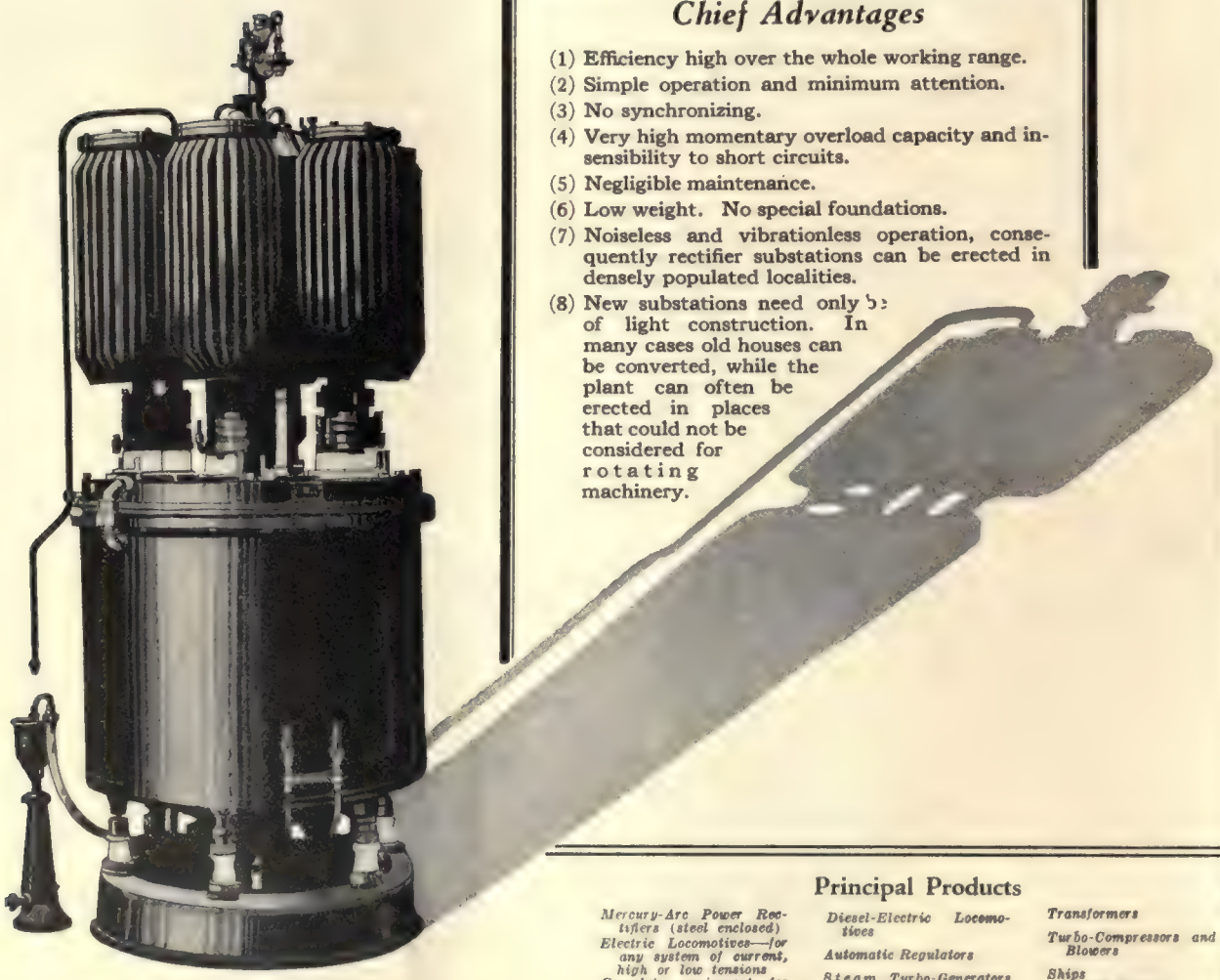
CINCINNATI CAR COMPANY
Cincinnati, Ohio

CINCINNATI New CARS

*A step ahead of the modern trend*

# American BROWN BOVERI

# 4.24 per cent



### Chief Advantages

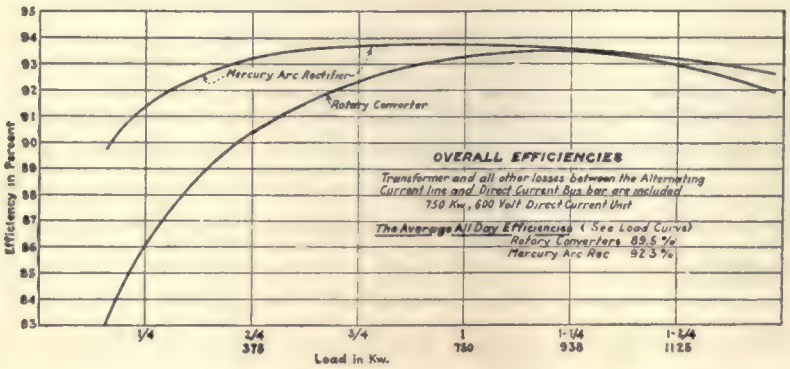
(1) Efficiency high over the whole working range.
(2) Simple operation and minimum attention.
(3) No synchronizing.
(4) Very high momentary overload capacity and insensibility to short circuits.
(5) Negligible maintenance.
(6) Low weight. No special foundations.
(7) Noiseless and vibrationless operation, consequently rectifier substations can be erected in densely populated localities.
(8) New substations need only be of light construction. In many cases old houses can be converted, while the plant can often be erected in places that could not be considered for rotating machinery.

### Principal Products

*Mercury-Arc Power Rectifiers (steel enclosed)*
*Electric Locomotives—for any system of current, high or low tensions*
*Complete equipment for railway electrification*
*Rotary Converters*
*Motor Generators*
*Complete equipment for outdoor and indoor substations*
*Diesel-Electric Locomotives*
*Automatic Regulators*
*Steam Turbo-Generators for normal or high pressures and superheats*
*Oil Switches and Circuit Breakers*
*Transformers*
*Turbo-Compressors and Blowers*
*Ships*
*Diesel Driven*
*Turbine Driven*
*Electrical Driven*
*Dredges and Harbor Equipment*

# Mercury-Arc Power Rectifiers

# *Higher Efficiency*




Compare the average over-all efficiencies on the above chart, taken from the daily performance of a 750 kw.-hr., 600 volt substation.

Rotary converters—89.5%.

Mercury-Arc Power Rectifier—92.3%

An increase in efficiency averaging 4.24% for this Rectifier, or a direct saving of $730 per year on a 20-hour day basis at 1 cent per kw-hr.

Estimate the attention charge at half that of rotary converters and you will appreciate what economy factors alone mean from the standpoint of a return on the investment.

These are some of the reasons for the rapidly growing acceptance of A-B-B Mercury-Arc Power Rectifiers for electric railway substation service throughout the United States.

*Descriptive Circular No. 301 describes A-B-B Mercury-Arc Power Rectifiers.*

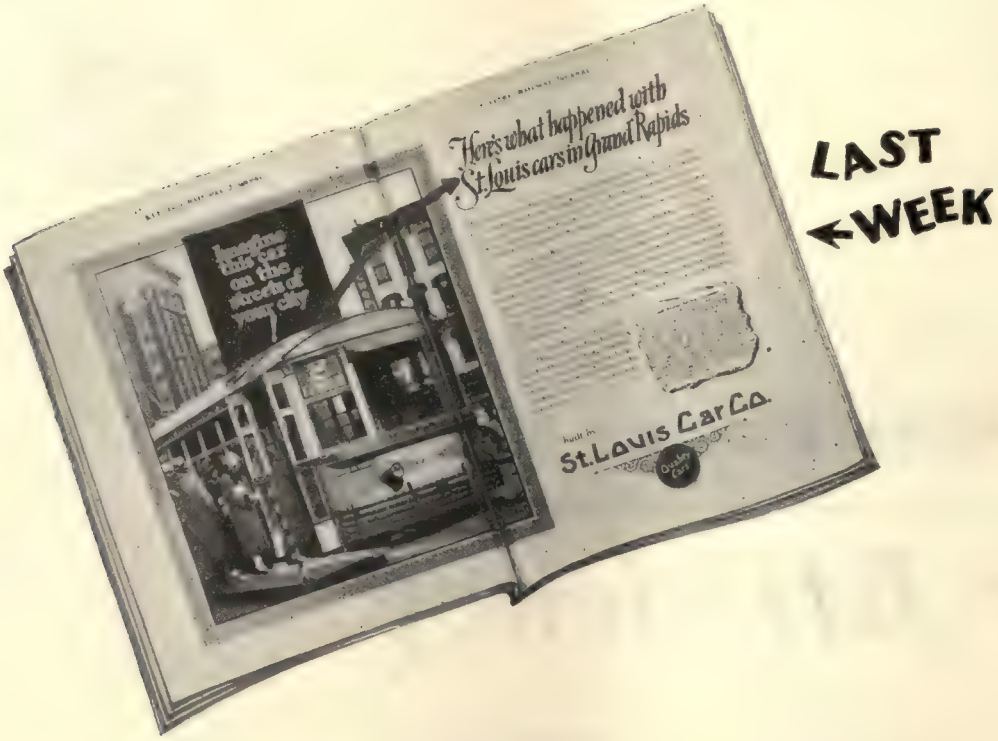
American Brown Boveri Electric Corporation

165 Broadway, New York, N. Y. Camden, New Jersey

922 Witherspoon Bldg., Philadelphia. 842 Summer St., Boston. 230 South Clark St., Chicago

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1927

# AMERICAN BROWN BOVERI



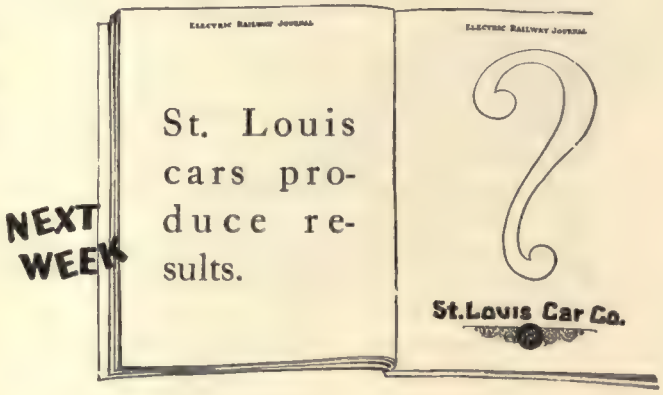

The public *today* is no different than it ever has been. The demand for rides is greater than ever.

But the public has been educated to greater riding comfort—and demands better transportation.

It's up to the car builder and the operator to supply cars that attract the public. It's business suicide not to do so.

And by the same token, it's good business judgment to give the public what they demand—new, light-weight modern cars.

That's why the "Quality Shops" is boosting modernization programs.

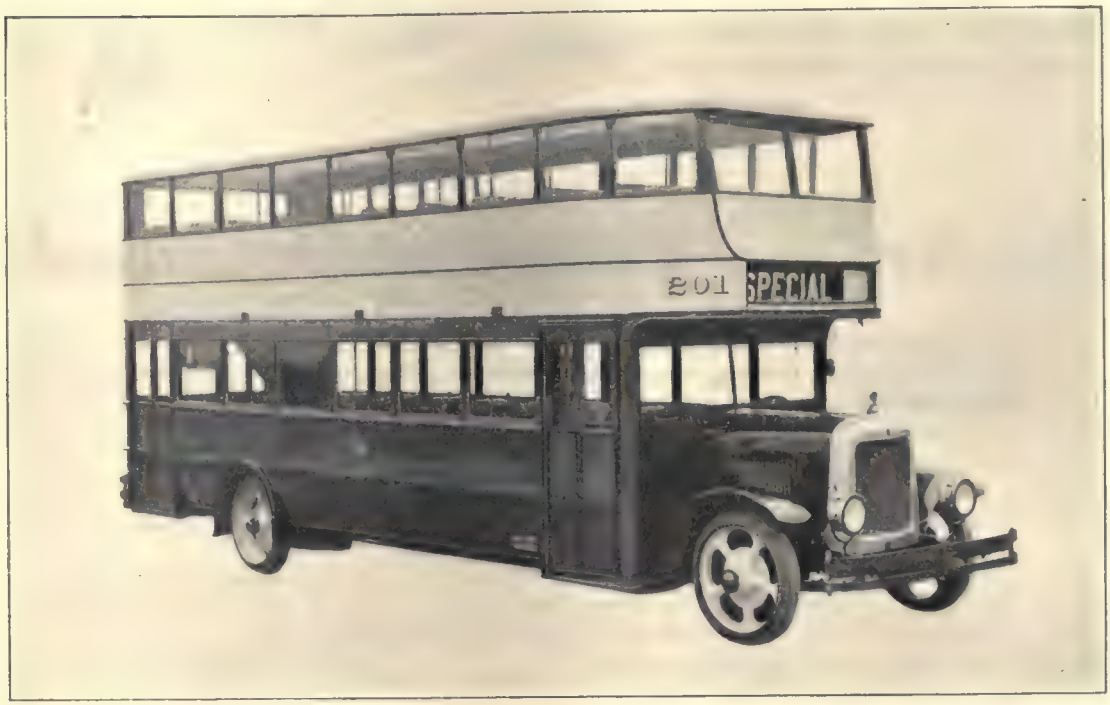



# St. Louis Car Co.

Quality Cars

# PHILADELPHIA RURAL TRANSIT CO.

## orders 202 more ECONOMY METERS




## FOR NEW GAS-LECTRIC BUSES

This repeat order is the result of a year's experience with 375 Economy Meters installed on all of the Gas-Electric Buses now being operated by the Philadelphia Rural Transit Co.

These meters have an excellent accuracy curve even under the greatly varying voltage and current conditions typical of the gas-electric drive. They are connected to measure the output of the gas engine driven generator and will thereby afford definite means for comparing the relative efficiencies of the bus drivers and also for comparing operating efficiencies of the gas-electric power plants.

In addition, the Kw.h. Inspection Dial feature of these meters serves the bus shop forces in determining the proper time for inspection and lubrication of equipment, in exactly the same way that they have served to such good advantage on more than 2,500 street cars of the Philadelphia Rapid Transit Company during the last five years.

# ECONOMY ELECTRIC DEVICES CO.

37 West Van Buren St., Chicago, Ill.

SANGAMO ECONOMY METERS
PETER SMITH HEATERS

BEMIS BOYERIZED TRUCK SPECIALTIES

WOODS FAREBOXES
HASKELITE—PLYMETL

Of all the phases of modernization, increased schedule speed has the most far-reaching effect on earnings. It boosts your "production" per man-hour, and thereby reduces operating cost per car-mile. Most important of all, *it sells more service.*

# Do modern cars increase schedule speed?

*Here are reports from six roads. Each has improved its schedules during recent years. In each case modern cars were necessary. General Electric car equipment is used on every road.*

"New equipment was necessary to maintain the increased schedule speeds in most cases."

LEVIS (P. Q.) TRAMWAYS CO.

"New light-weight cars, weight 32,000 pounds using GE-258 Motors, have been purchased and these accelerate much faster than the older, heavy type of car."

MORRIS COUNTY (N. J.) TRACTION CO.

"Scnedule speeds increased by a gradual cut in running time; also through new equipment affording better acceleration."

NEW ORLEANS (LA.) PUBLIC SERVICE, INC.

"Schedule speeds slightly increased. By reducing stand time; also by the use of new equipment."

BIRMINGHAM (ALA.) ELECTRIC CO.

"Our schedule speed has been increased. Made possible by better track conditions; improvements in equipment such as light-weight all-steel construction and improvements in the motor design which give the car a faster acceleration and running speed; giving more attention to schedule maintenance and construction; a more thorough study of traffic conditions."

SAN ANTONIO (TEX.) PUBLIC SERVICE COMPANY

"Schedule speed increased from 8 miles to 9.2 miles an hour. This was accomplished by making a survey and finding every possible place where the speed could be increased, and also by using new equipment in the form of safety cars with a quick pick up and by eliminating all unnecessary lagging."

WISCONSIN POWER & LIGHT CO.

The resources and the service of the entire G-E organization are available to consider the problems of modernization and co-ordination—to find the most effective means of transportation and to build appropriate equipment.

330-19

# GENERAL ELECTRIC

# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

*Volume* 69 New York, Saturday, April 30, 1927 *Number* 18

## The Four Horsemen Ride Again

THEY are riding again!—those apocalyptic horsemen of destruction. This time their diabolical forms are reflected in the swishing, sucking torrent of the Mississippi. They cackle with glee each time a levee breaks! They rock crazily in their saddles as home after home topples and then goes careening down the flood.

From Missouri to the Gulf these enemies of mankind are being fought with heroic effort and undaunted courage. While most of us sit in safety on the highlands, history grim and glorious is being made. Among its makers are hundreds of public utility men and women. That they have gone and will go beyond the call of duty is assured. That their heroic deeds will be set down is not so certain unless those who could only stand and wait will write what the actors were too modest to record. A flood of the present magnitude is bound to develop engineering and operating problems never before experienced. Each situation will add to the storehouse of knowledge. Each problem conquered will doubly arm the nation against the time the Four Horsemen ride again!

## A Little Book with a Big Message

VERY often much more attention than it really deserves is attached in business to the value of appearances as reflected in the clothes a man wears. It is appalling to think of how much business has been lost through officials, secretaries and office boys turning down the poorly dressed visitor, or what intellect and acumen have been steered toward poorhouses, jails and cemeteries by reason of the same false evaluation. For this reason one is elated to note that in a recently published brochure, "Our Part in Public Service," the Nashville Railway & Light Company is telling its employees that "clothes don't make the man."

Furthermore, it is backing up the action with a true story which is prefaced with these remarks: "Deal just as promptly, as willingly and just as courteously with the person of poor appearance as you would with one dressed in finery. Appearance means nothing in our business. The humblest citizen is entitled to and must receive the same courteous attention as the person with social standing or prosperous appearance."

But such a sound principle as this is only a tithe of what this vest pocket compendium of good manners contains. Among other paragraphs that make it stand out from the ordinary run of courtesy creeds is the one devoted to the subject of how to say "hello" without keeping the "hell" in it. In this particular, much has been written about telephone courtesy, but the JOURNAL does not recall any text so far that has so skillfully or convincingly pointed out what a vital part voice inflection plays in this phase of public relations.

Those responsible for the little book do not hesitate to attack quite seriously one of the great curses of big business, i.e., departmental jealousy. On this subject, and one captioned "The Public Is Fair When Fully Informed," there are rare expressions of good, hard common sense. Thirteen hundred of the booklets have been distributed among employees of the company, and it is no exaggeration to state that this distribution could be multiplied by a hundred to the ultimate benefit of all those who in our field are striving to bring about a deeper and keener understanding of the public relations problem. Had "Our Part in Public Service" been published in the era of the Latins they would undoubtedly have pronounced it *multum in parvo*.

## Wanted— A Maintenance Exhibit

EVEN though the Cleveland convention is still more than five months away, it is none too early to get exhibit plans under way. All signs indicate that this will be the greatest convention ever held by the industry. It is significant that several operating companies have already notified Director of Exhibits F. C. J. Dell that they are planning to show new cars and equipment developed on their properties. Likewise, progressive and wide-awake manufacturers are making preparations to show the most recent improvements in their apparatus so as to be identified with the march of progress in the industry.

That this year's car exhibit will exceed in size the record-breaking showing of last year seems more than probable, as the result of the energy and enthusiasm which J. H. Alexander, chairman of the exhibit committee, is putting behind this phase of the convention. That it will far exceed last year's exhibit in the showing of radical developments in car body and truck design is already assured by the several construction experiments which are under way.

There is, however, one important phase of an electric railway exhibit which has in the past been obviously deficient in comparison with its importance as a major item in successful operation. That is the showing of tools and equipment which decrease maintenance costs and improve workmanship. Electric railway shops are notoriously lacking in modern tools and machines. This is in part, at least, attributable to neglect of the field by the manufacturers of such equipment. True, electric railways have been poor buyers of tools and machines. They have in the past worried along with old machines as best they could and have overlooked the savings which modern shop equipment make possible. Part of this situation is attributable to their depleted finances,

but another important factor has been neglect of the market by the tool manufacturers. There is a feeling among them that one large automobile manufacturer is a better prospect for machinery sales than is the electric railway field. In a measure, there was in the past some basis for this viewpoint, because the progressive motor manufacturer does not hesitate to throw out old machines to make even a small reduction in his manufacturing costs.

Today, however, the electric railway situation is changing rapidly. There is a growing interest in all phases of modernization. There is under way an active campaign for better methods, increased efficiency and improved performance. In addition, the bus has become an important part of the transportation industry, and with its introduction efficient maintenance machinery takes on increased importance. Wide-awake maintenance equipment manufacturers may well afford to interest themselves in the opportunity for showing their products under the favorable conditions that will exist at Cleveland.

## Figures for 1926 Very Encouraging

SIGNIFICANT, indeed, is the interpretation of the facts contained in the association's statistical study of the earnings of the electric railways for 1926, abstracted elsewhere in this issue. It is apparent, for instance, that companies other than the large ones are beginning to share in the improved conditions of the industry. The affairs of the very small companies, however, are still bad, but it should be borne in mind that these companies constitute only a fraction of the total. In fact, their influence on any statement reflecting the operations of the whole industry is practically negligible.

While the electric railways are increasing their bus services they are not curtailing their rail lines, but are giving more rail service measured in car-miles than they ever did. And they are doing this even though on the whole fares are not what they should be. The average fare per passenger in 1926 was 7.10 cents. In order to produce the same net today as in 1912 the average fare should have increased 56 per cent instead of 35 per cent; in other words, the average fare should be 8.22 cents instead of 7.10 cents. Since the railways have shown their confidence in the public's integrity by expending the money necessary to provide additional service, the obligation of the public, as the JOURNAL has repeatedly pointed out, is of course to pay for that service so that the railways may receive a fair return on the money they are investing.

The author of the article commenting on the figures makes no bones of the fact that many electric railway managements have neglected to take advantage of improved methods and equipment which might have helped them to better their conditions. It is his idea that they have been especially derelict in the field of public relations. On the other hand, the more progressive managements among both the larger and the smaller properties, with operating conditions identical with those of the rest of the industry, have by their skill and their readiness to adopt new ideas succeeded in holding or increasing their traffic and enlisting the co-operation of their patrons, so that as a result they have been able to secure more equitable consideration from the public authorities. This is very encouraging. Despite all the seeming cross-currents the conclusion is inescapable that the companies comprising the great bulk of the industry, while by no means prosperous, are nevertheless confidently going forward with plans for the future and that there is every reason to take heart.

## Another Year of Legislative Debate at Boston

FINALLY all the thunder on Beacon Hill with its promise of legislation for the Boston Elevated Railway has proved to be nothing but a dud. The Legislature has come to the end of its session, has wasted a great deal of time with matters affecting the Boston Elevated, rejected one proposition after another, and at last discarded everything. Nothing suited the lawmakers. Never in the history of Boston railway legislation has a case been more thoroughly prepared than was the Elevated situation this year, with most comprehensive plans from commissions and individuals of recognized merit.

Gov. Alvan T. Fuller was insistent upon some action, but the only thing that has come out of it all is a request to the Department of Public Utilities to value the road. Even that was a hurried afterthought. There were all the extremes, from a 50-year extension of public control of the Elevated to an immediate return of the property to the stockholders, and between these extremes came numerous compromises, resulting in bitter clashes among factions in the Senate and the House. It was earnestly argued that even if no legislation could be agreed upon regarding the control and financing of the company there must be no failure to provide for the physical extension of the rapid transit system. Even this has gone by default.

## Montreal Takes a Step Ahead in Power Conversion Equipment

DURING the past decade, in the power supply for electric railway service, changes have taken place from the manual substation to the automatic synchronous converter station, which has become almost standard for a large number of railways. Much more recent is the development of the mercury-arc rectifier for this class of service. The installation of rectifiers made by the Montreal Tramways represents what is probably the first fully automatic substation in America using rectifiers. Certainly it is the first automatic rectifier station in Canada.

While it is not to be assumed that the rectifier is a fully perfected piece of apparatus, it has gone a long way from the small glass bulb device. Save the principle, the latter has little in common with the steel inclosed rectifiers that have been developed for conversion of hundreds of kilowatts. Perfection of rectifiers such as these used in Montreal may be regarded as another triumph of engineering.

It is yet too early to know the results from the use of the Montreal rectifiers over long periods of time in heavy service. Similar equipment has been used in Europe for several years with satisfactory results, and the operating problems are well on the way to solution. It is to be hoped that the experience in Montreal will go far toward determining the applicability of the device

in electric railway power circuits. The simplicity from an operating standpoint and the ease of providing full automatic control make it ideal for railway service.

## Two Small Railways Come Into Their Own

BEFORE the calamity howlers of the daily press again draw the diapason of disaster and begin the final fugue of the funeral march over the electric railways in small communities they should ponder well the cases of the companies in Williamsport, Pa., and Fitchburg, Mass., reported in the JOURNAL for April 23. True, peace and plenty are not likely to flow forth in these places for the railways as they did from Ceres' cornucopia, but these two instances do show what railway men of leonine heart, aided and abetted by their communities, have done to restore to these roads the prestige they deserve. In the past things were not what they might have been in these towns from the standpoint of transportation, but all this has changed, changed because, unlike Trilby, the local people were not tone-deaf.

It is a different scene now to which "Williamsport Welcomes You" and upon which Fitchburg felicitates itself, different because responsible local people were unwilling that their railways, like those in some other communities, should be permitted to slip into the slough of innocuous desuetude. All the electric railway in the small community asks is a square deal. It is entitled to that and nothing less. It doesn't want pity and it doesn't need it. Far too many railways in cities the size of Williamsport and Fitchburg have, however, been permitted to go from bad to worse, not because of any unwillingness of the responsible railway managers to do their part, but because local people of power and influence have been as destitute of backbone as a banana.

## Track Developments Keep Pace With Rolling Stock Improvement

NOT to be outdone by the equipment engineers who recently have made notable innovations in rolling stock design, way engineers are busily occupied trying out new methods of track construction. An outstanding instance of this kind is the development of a base plate joint by the Eastern Massachusetts Street Railway. Details of its construction and a summary of the results obtained are given in this issue by Frank B. Walker, chief engineer.

Use of a welded base plate in addition to a pair of fish plates is not new. In these experiments, however, the fish plates have been omitted and only the base plate is used. Theoretically this scheme places the metal where it will do the most good. With a suspended joint the rail heads in contact carry any compression stresses and the welded base plate takes the tension.

Bending tests made at the Massachusetts Institute of Technology indicate that this type of joint is at least as strong as the ordinary welded fish plate joints, which have given satisfactory service for a number of years on this railway. Its strength appears greater than that of the rail itself, as numerous failures in the tests occurred by fracture of the rail rather than yielding of the joint.

It is too soon to draw conclusions as to the ultimate effect of these experiments on design of the track structure. If the base plate joint proves to be an acceptable substitute for other types now in use, it will mean a substantial saving for the railways. Developments of this kind are perhaps less spectacular than the recent ones made in car design, but they too play an important part in keeping the electric railway industry abreast of the times.

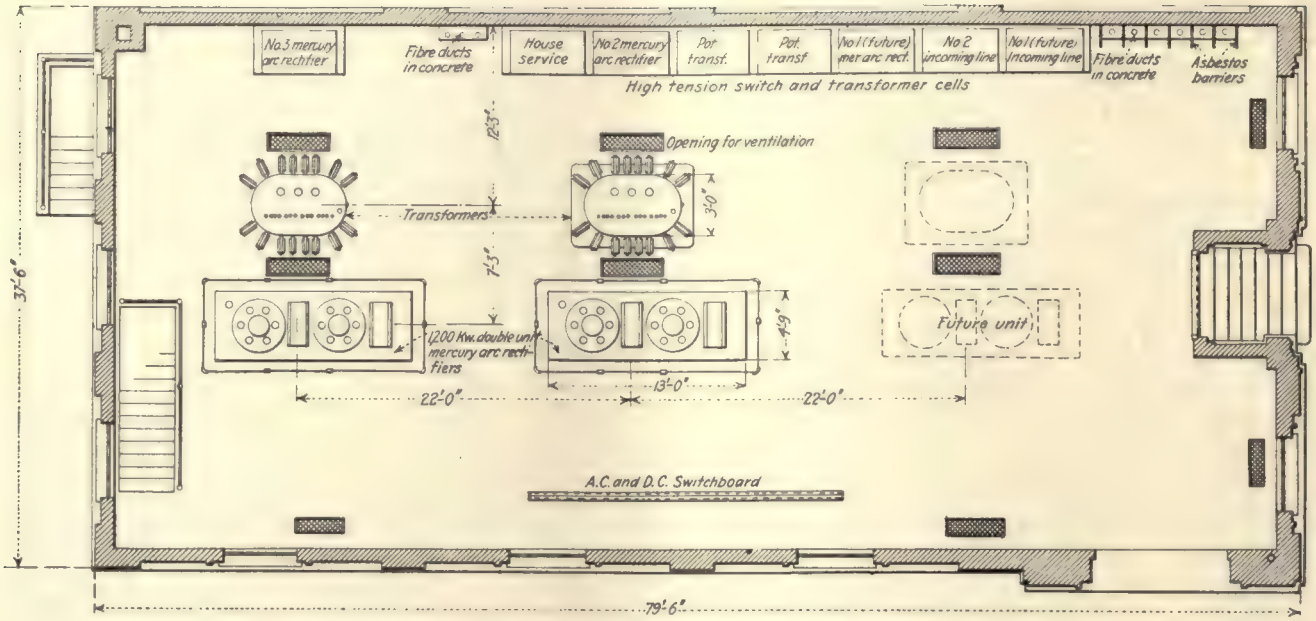
## Detroit Takes a Step Backward

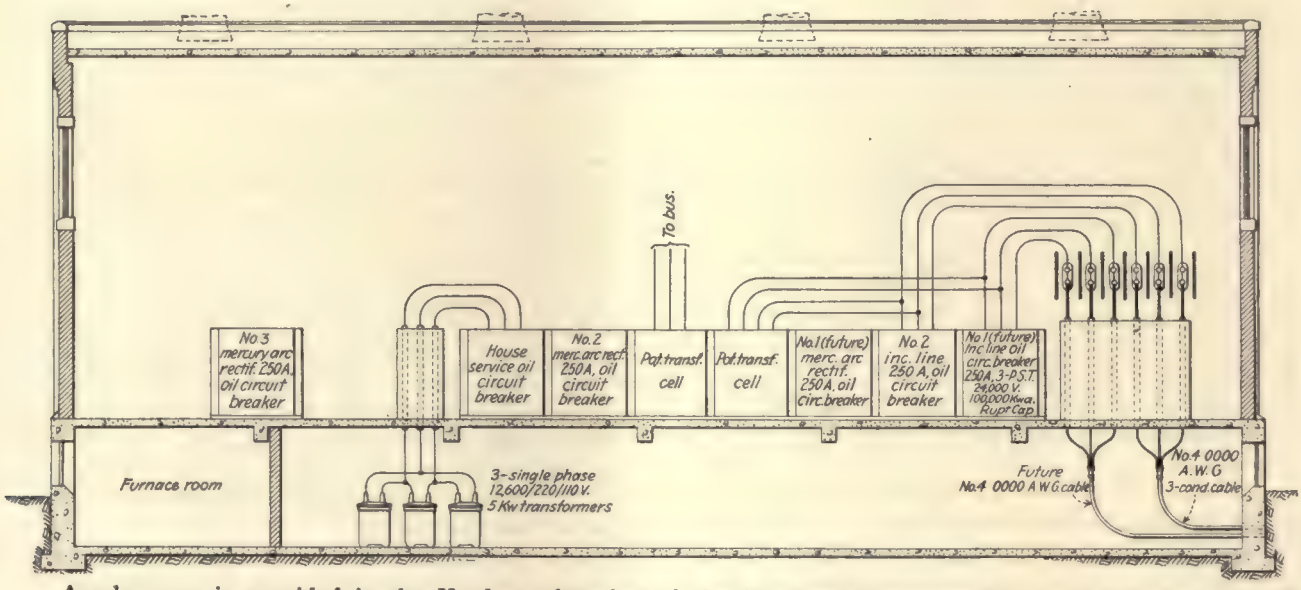
GLEE is a great thing—when it isn't misdirected. In gloating over the defeat of the paving relief measure in favor of the municipal railway in Detroit, the *Free Press* appears to have started off with the wrong foot. It is not the first time this paper has done that very thing. There is no need for ELECTRIC RAILWAY JOURNAL to reiterate that it holds no brief for municipal ownership, but while the *Free Press* does the same thing it leans over backward in its effort to stand up straight. The same paper says that in turning down the paving relief measure the electors rose above specious arguments and showed that they understood the significance of the question at issue. They are said to have displayed "discrimination and discretion." According to the *Free Press* "the cost of paving between tracks is a natural and legitimate charge against the railway system, and by retaining it as such the voters insist that municipal transit facilities be operated and financed according to the methods and principles that would be adhered to if the lines were privately owned."

Indeed, and who told the *Free Press* that? It sounds like ancient of days. Doesn't that paper know that the thing the municipal railway sought is the very form of relief five states and more than 50 municipalities have already granted to private companies? If it did know it and did not say so, it was unfair, to say the least. If it did not say so because it did not know it, then that paper was ignorant.

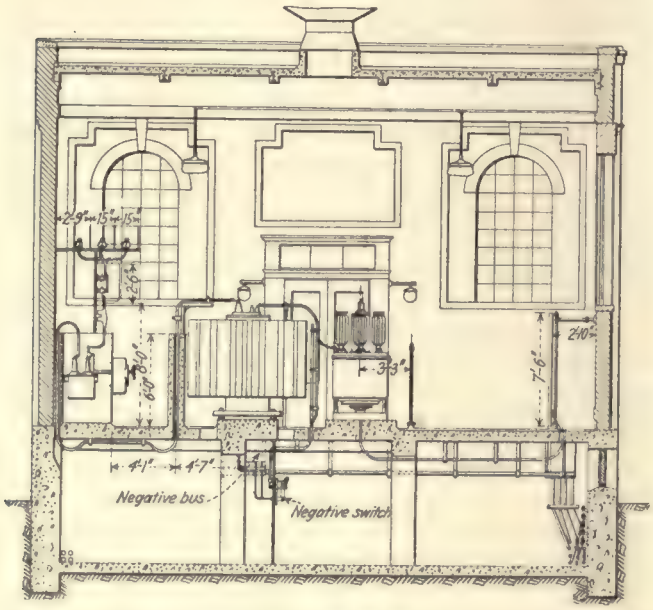
The arguments in favor of paving relief are so well known to JOURNAL readers that there is no need to reiterate them. Paving burdens imposed upon the railways, if they ever were justified, are an anachronism in the present day and generation. The measure of relief extended to the railways proves that they are being increasingly so accepted. And if they are an anachronism as applied to private companies, surely they are no less an unwise exaction in the case of a municipal railway. They are a charge that the rider must meet, and to the very extent that such payments are exacted they are a factor in increasing fares.

No, in defeating the relief measure at Detroit, the voters there did not show they really understood the significance of the question at issue. They showed discrimination but not discretion. Their discrimination was not only against the municipal railway but against themselves. As for the *Free Press*, it wrote itself down as either ill-informed or prejudiced. It is one thing to be against municipal ownership. But it is quite another not to be willing to concede to the municipal railway relief from onerous exactions properly but gradually being lifted from the backs of the privately operated companies. That is all there is to it. But that is quite enough.

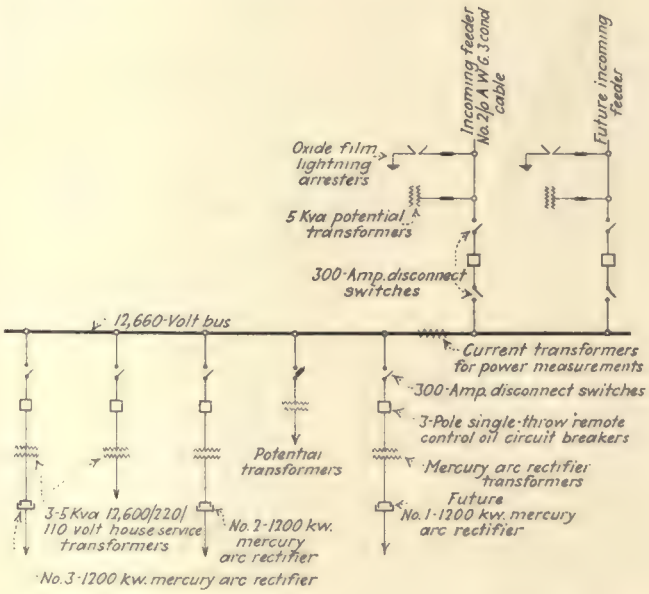



**Ample room is provided in the Verdun substation of the Montreal Tramways for three 1,200-kw. mercury rectifier units. Two are now installed and in service**




**The arrangement of the Verdun substation is simple. Note absence of special foundations beneath the rectifiers**




**Simplified connection diagram for the mercury rectifier substation**

The mercury rectifier substation is located on one of the main streets of Verdun. On account of the absolute quietness of the equipment no objection was raised, and no precautions were necessary to inclose the doors and windows

## First Canadian

# Automatic Rectifier Substation

## Installed by Montreal Tramways

**Two 1,200-kw. mercury arc rectifier units supply power for operation of a section of the Montreal system at 600 volts d.c. Power from a 12,000-volt, three-phase circuit is converted without use of rotating equipment**

CANADA'S first automatic mercury-arc rectifier substation has been placed in operation in the city of Verdun by the Montreal Tramways. During the past year the loads on this portion of the railway system have been increasing, and trouble was experienced on account of low voltage in Verdun and the wards of St. Ann, St. Gabriel and St. Paul in the city of Montreal.

Equipment of various kinds is used in the power system, so that any new substation would have to work in parallel with all of the existing apparatus. The major portion of the power for the operation of the Montreal Tramways is taken from the system of the Montreal Light, Heat & Power Company, being supplied in bulk at the Hochelaga power house, as shown on the map of the system. Here the power company has an outdoor station for changing from 66,000 volts to 12,600 volts for local distribution in Montreal and vicinity. The distribution for the tramway system is all at the lower potential, and except for a small distance is all carried in underground conduits owned by the tramway.

The Montreal Tramways maintains a power station at Hochelaga, which contains two 12,500-kw. turbo-generators, supplying three-phase alternating current at 12,600 volts, 60 cycles, and also a direct-current standby plant, containing two 1,000-kw. and one 2,000-kw., 600-volt direct-driven units. This power station is not used in regular service, the boilers being banked during the winter. They are called on only occasionally. In summer purchased power is used exclusively.

Synchronous converters, synchronous motor-generators and induction motor-generators are all used for conversion of the power to direct current, in addition to the new rectifier units. Rating of equipment in the various substations is given in the accompanying table.

The new substation is situated at 3980 Wellington Street, in the center of the business district of Verdun. The engineers of the tramway decided that on account of the location it would be imperative to install equipment free from the ordinary noise and vibration usually associated with power stations. It was also considered desirable to provide full automatic operation, in line with the policy of the company for utilizing this class of apparatus wherever possible.

The station has been constructed and was placed in service on Feb. 10, the control switches being closed by Mayor J. P. Dupuis of Verdun in the presence of a large number of prominent civic representatives and tramway officials. The effect of placing the station in operation has been to improve materially the power distribution system of the company in this section.

The equipment is housed in an attractive brick building, 34 ft. 3 in. x 75 ft. 8 in., inside measurements. As shown in the interior views, the high-tension switching

All the equipment in the Verdun substation of the Montreal Tramways is seen leads at the right and passes out as direct

compartments are ranged along one wall, while the main switchboard is near the opposite wall. In the center are the rectifiers and the transformers supplying them.

### Reasons for Selecting Rectifiers

In the selection of equipment for the new substation a number of considerations were taken into account, which led to the choice of mercury arc rectifiers for the conversion units. The reasons for the choice may be stated as follows:

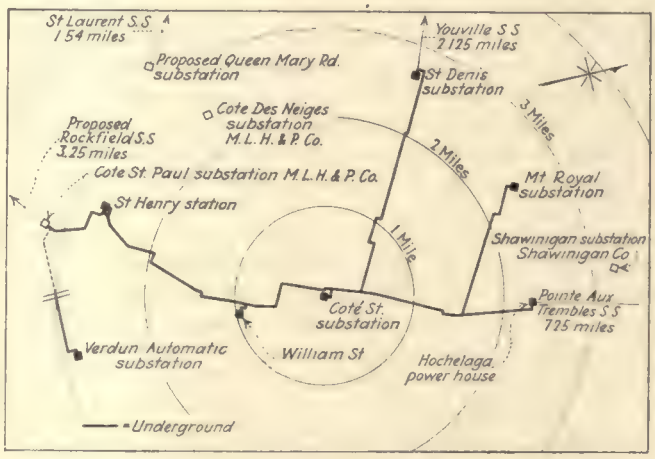
1. Higher average over-all efficiency under all load conditions.

2. Cheaper building owing to absence of heavy foundations or equipment.

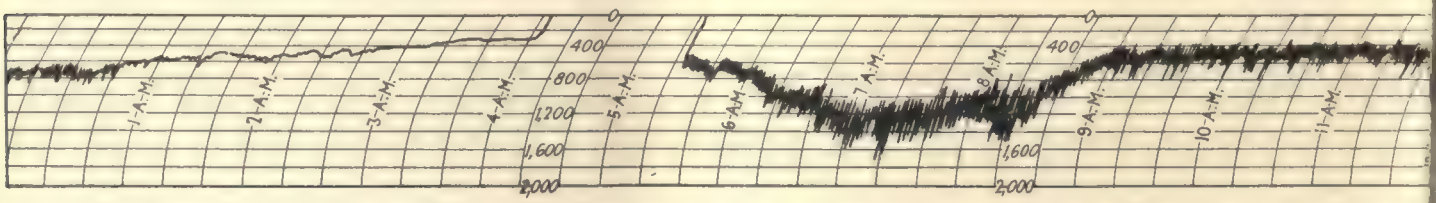
SUBSTATION EQUIPMENT OF THE MONTREAL TRAMWAYS

| Station | Number of Units | Rating Each, Kilowatts | Type of Machines |
|---|---|---|---|
| Coté Street (Central distributing station) | 4 | 2,000 | Synchronous converters |
| Mount Royal | 2 | 2,000 | Synchronous converters |
| | 1* | 2,000 | Synchronous converter |
| St. Denis | 2 | 1,500 | Syn. motor-generators |
| | 2 | 500 | Induc. motor-generator |
| Youville | 2 | 500 | Induc. motor-generators |
| William Street | 3 | 1,500 | Syn. motor-generators |
| William Street | 6 | 500 | Ind. motor-gen. (2-phase) |
| | 1 | 500 | Syn. motor-gen. (2-phase) |
| St. Henry | 1 | 1,500 | Syn. motor-generators |
| | 2 | 500 | Ind. motor-generators |
| Cote St. Paul | 1 | 1,200 | Syn. motor-generator |
| St. Laurent | 2 | 500 | Synchronous converters |
| Cote des Neiges | 1 | 1,000 | Syn. motor-generator |
| Point aux Trembles | 1 | 1,000 | Syn. motor-generator |
| | 1 | 500 | Ind. motor-generator |
| Shawinigan† | 3 | 1,000 | Synchronous converters |
| Hochelaga | 1 | 2,000 | Synchronous converter |
| | 2 | 1,000 | Synchronous converters |
| Verdun | 2 | 1,200 | Mercury rectifier units |

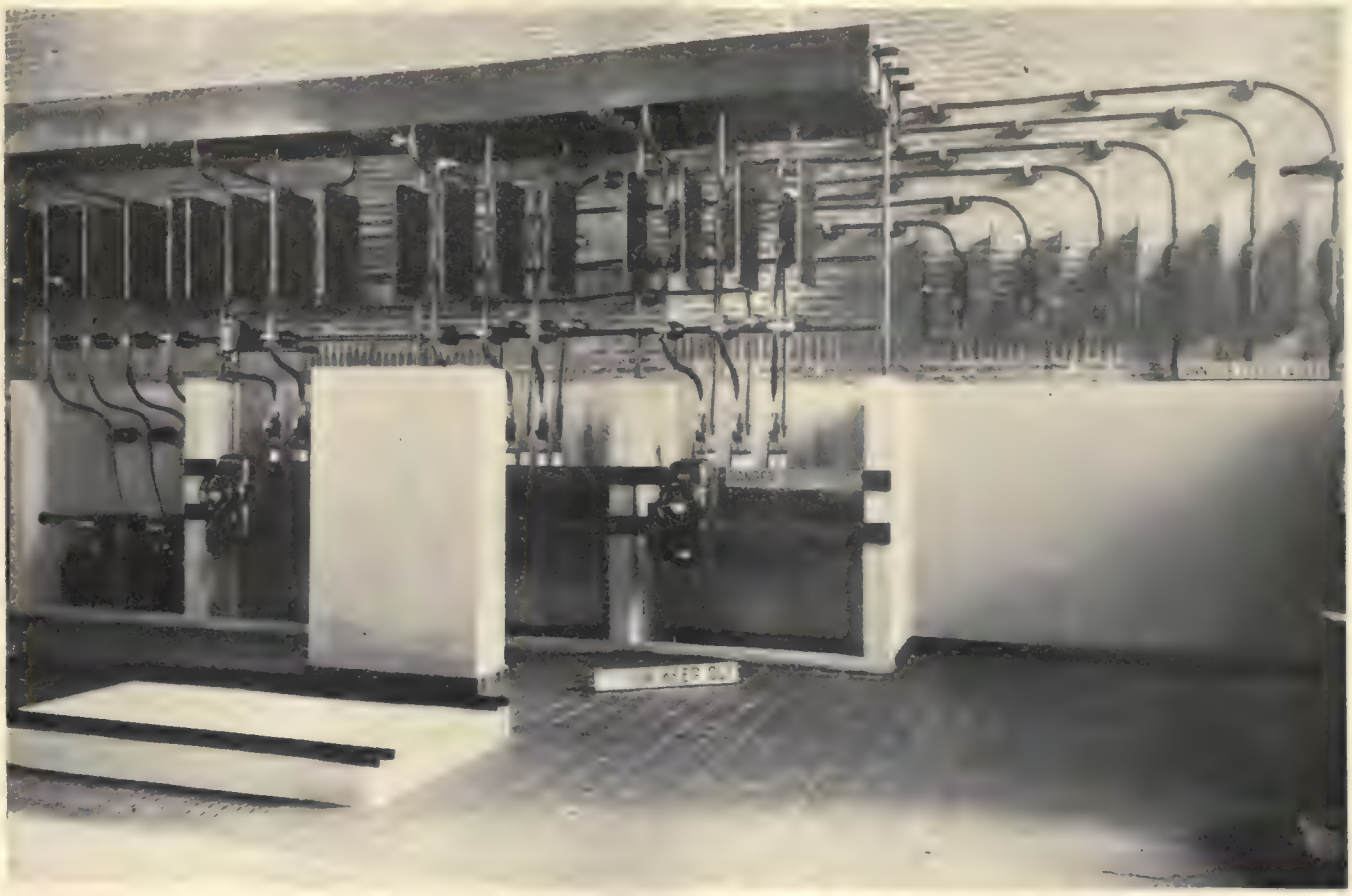
* On order. † Not owned by Montreal Tramways.




Map of the power system of the Montreal Tramways, showing the relative position of the Verdun substation




Load chart for the 24 hours of March 10. The station was shut down at 4 a.m. on account of low current demand and



in these two views. The alternating current enters through the high-tension current through the feeder lines at the left

3. Low cost of maintenance.

4. Simplified control as compared with the apparatus for starting and synchronizing rotary converters or motor-generators.

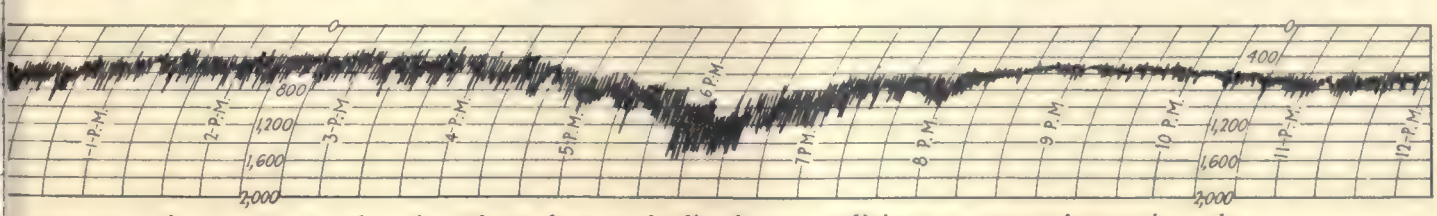
5. Absence of noise and vibration.

Four mercury-arc rectifiers, each rated at 600 volts and 1,000 amp. d.c., with the necessary transformers and control equipment, make up the installation. These rectifiers are assembled in pairs, each with a single three-phase transformer, in order to simplify the wiring and control equipment and to reduce the cost. There is provision for a third set of rectifiers, which will bring the station capacity up to a total of 3,600 kw. of direct-current output.

At present three-phase, 62½-cycle, 12,000-volt power is taken from the Montreal Light, Heat & Power Company's lines at Gate Avenue and Bond Street, at a point near the Montreal water works aqueduct, from where it is carried in an underground No. 00 three-conductor cable running directly to the substation. The line terminates in a pothead in the basement, from where the three leads are carried to a set of hand-operated 300-amp. disconnect switches at the front of the station. Provision is made for the entrance of a duplicate power line when needed. These may be seen at the extreme right of the general view of the main floor. The current then goes through a three-pole, single-throw, 250-amp., 24,000-volt oil circuit breaker, operated by Brown-Boveri type N-4 motor control. It is controlled by the line voltage through a potential transformer. The breaker is closed automatically when there is voltage on the line and is tripped by a no-voltage relay when the voltage is off. It can thus be controlled from the power station. The breaker is protected by type H-4 series overload relays which are set for a definite time. If these relays operate they trip and lock out the breaker, which cannot reclose until the lockout is reset manually. Through selectivity with the breakers between the a.c. bus and transformers the line breakers will trip by overload only in the event of a short circuit on the a.c. bus and under these conditions it is not desirable to reclose them.

A second set of disconnect switches on the station side permits the line breakers to be cut out of circuit entirely for inspection or setting. From the main alternating-current bus the current is taken through a set of disconnects and circuit breakers to the primaries of the 1,800-kva., three-phase, 12,600-volt transformers, where the pressure is stepped down to a value suitable for the rectifiers, and also is converted to six phase.

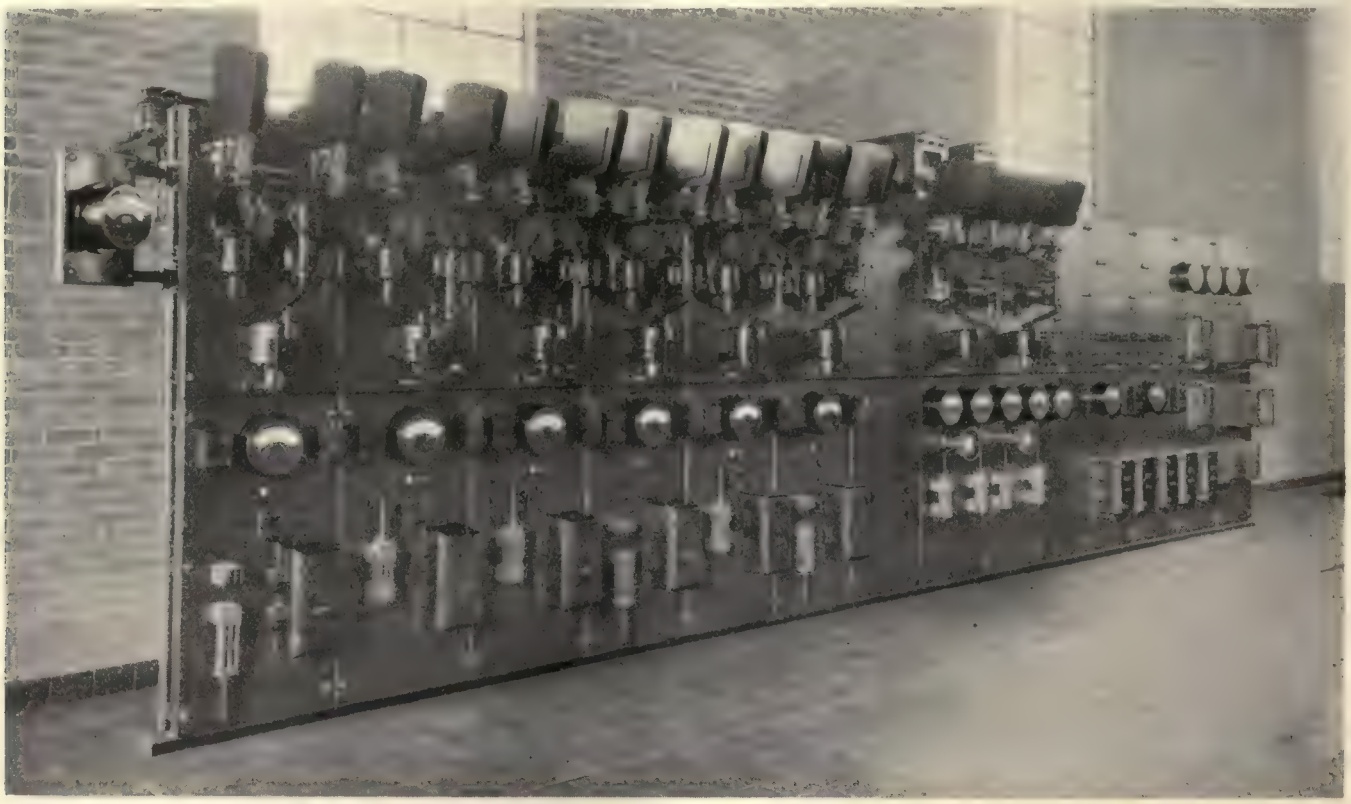
The circuit breakers between the a.c. bus and rectifier




came on again at 5:20 a.m. when the voltage drop on the line became sufficient to actuate the starting relay

transformers are operated by type N-4 motor control and are protected by H-4 overload relays set for instantaneous tripping on overload. If tripped by overload these breakers will reclose after intervals of ten seconds, one minute and three minutes. If tripped after the last closure the breakers will lock out and will not close again until the lockout is reset.

Each transformer has twelve secondary terminals and a neutral, as the windings are in duplicate to supply the two rectifiers independently. The neutral is grounded and forms the negative side of the d.c. circuit. The mercury cathode forms the positive d.c. terminal, and is connected to the 600-volt bus through suitable switches and circuit breakers.



General view of the direct-current switchboard. The feeder panels are at the left and the control for the rectifiers at the right

### Rectifiers and Vacuum Pumps

The conversion units are Brown-Boveri type GRZ-56 mercury-arc rectifiers, each rated at 1,000 amp. and 600 volts d.c. output. Two of these rectifiers make up a unit which is rated at 1,200 kw.

Each rectifier is incased in an airtight steel shell which contains six anodes, each connected to one of the transformer terminals. The single cathode consists of mercury in a receptacle at the bottom of the pot. Auxiliary anodes are included to insure continuity of the arc and for starting the action when the rectifier is switched into circuit.

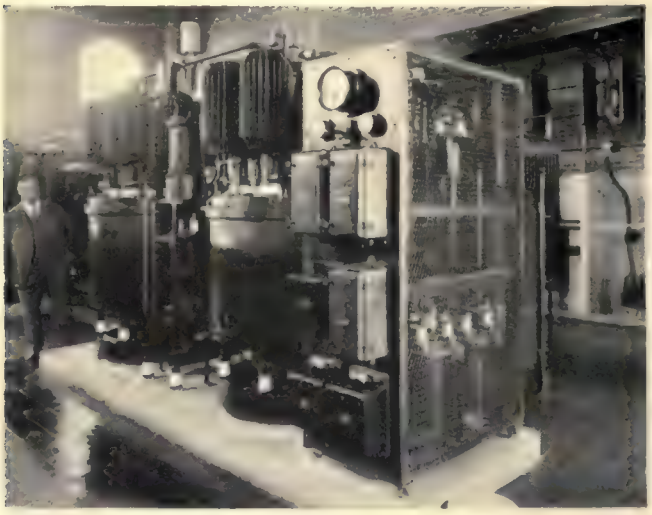
Since the casing of the rectifier is entirely of steel and the interior is not lined with insulating material the pot is at the potential of 600 volts above ground. It is therefore necessary to protect against accidental contact with the casing, which is done by the metal screens which surround the apparatus.

Successful operation of the rectifiers demands that a pressure of the order of 0.01 to 0.001 mm. of mercury be maintained. Since it has not been found practicable in commercial rectifiers to prevent small infiltration of gases it is necessary to pump them out as fast as they enter the case. For this purpose a high-vacuum mercury pump is connected in series with a rotary oil-immersed pump. The rotary pump is driven by a ½-hp. a.c. motor and forms the only normally moving part in the entire station. Their operation is independent of the rectifiers and they will maintain the vacuum whether or not the latter are connected to the circuit.

The current that may be drawn from the rectifier is determined mainly by the temperatures that may be endured by the working parts. In order to make the rating as large as practicable, the rectifiers are cooled by means of water circulated through jackets. This water, which is drawn directly from the city mains, is first passed through the cathode base, from there to the jacketing around the large cylinder and the anode plate, after which it passes to the jacket surrounding the condensing cylinder and then out to the sewer. The quantity of water required is about one-third gallon per minute per 100 amp. d.c. at an intake temperature of 15 deg. C. A small additional amount for the vacuum pump is needed. In view of the small amount of water and the desire to eliminate moving machinery wherever possible, it was decided not to attempt the use of a recooling system. It also was considered inadvisable to attempt recooling during the severe winters, as the heat loss in the station is so small that there would be insufficient protection against freezing.

### Control and Protective Devices

The rectifier station is cut out of circuit entirely if the current falls below a predetermined value. This value is now under process of determination so that the station will go off the line during the hours of the night when the demand is lightest. The station is cut



Near view of one of the mercury-arc rectifier units. Each of the rectifiers is rated at 600 kw., so that the set has a total capacity of 1,200 kw.

This view was taken directly beneath one of the rectifier units to show the connections and the pipes for conveying the cooling water

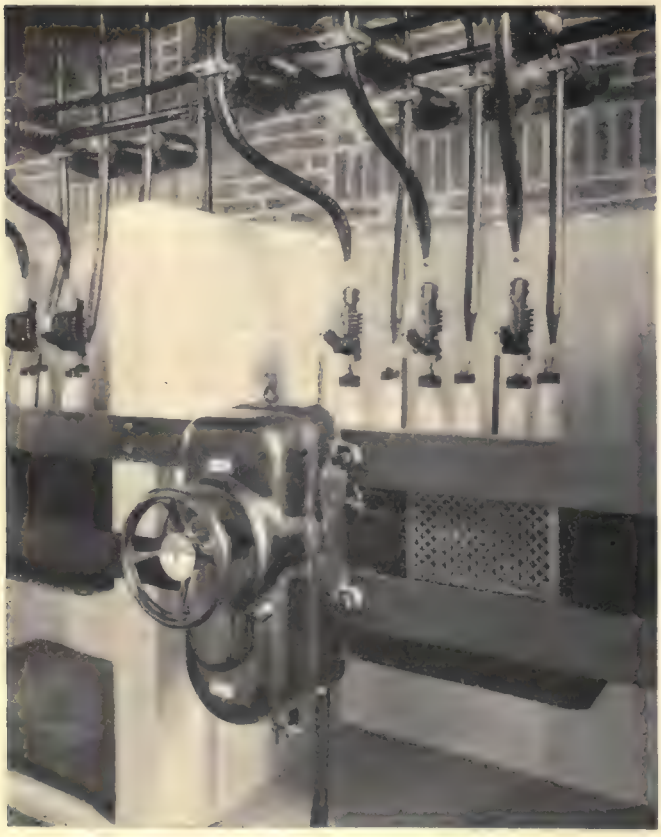
in automatically by low voltage, so that it comes on the line in the morning when the cars begin regular day service. The value for this relay setting is likewise being determined.

As the current drawn from the a.c. line passes full load on the first rectifier unit (2,000 amp.) the second unit is cut into circuit automatically. It is also possible to arrange the relays so that the second unit will be cut in and out of circuit by means of a time clock. At present the latter method is being followed.

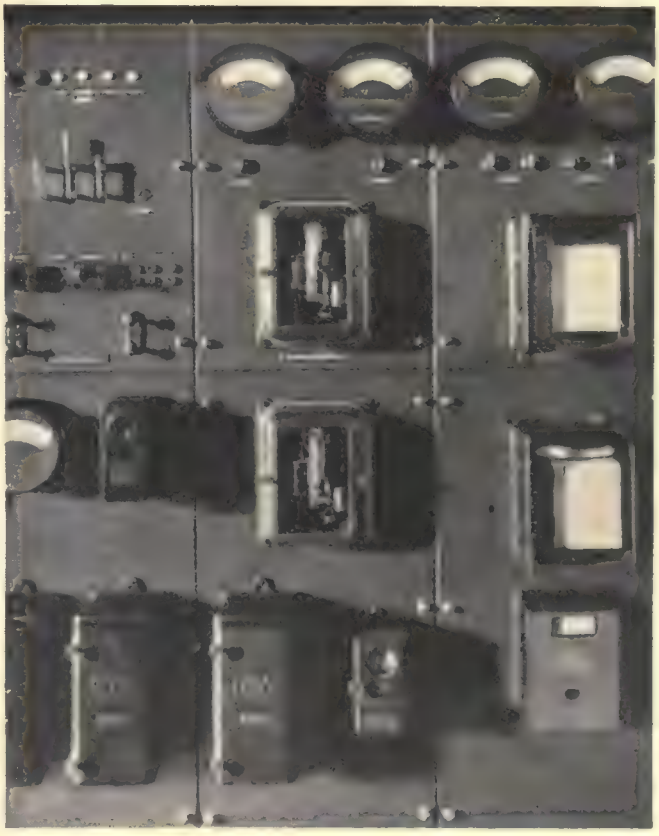
A full set of automatic devices prevent damage to the equipment if load should become excessive or if some part should fail. The action of the oil circuit breakers has already been described. If the breakers on one of the rectifier units are locked out the second group immediately will come into service. Thermal relays in the rectifiers and transformers protect against prolonged overheating. Low vacuum or failure of the cooling water supply will also automatically lock out the rectifiers.

Signal lamps on the switchboard indicate the positions of the circuit breakers. Each rectifier group has five four-point selector receptacles on the switchboard, so that the rectifiers can be started by clock, low voltage, low current or manually, as desired, depending on the position of the plug in the receptacles.

Efficiencies guaranteed for the equipment, as meas-



One of the oil circuit breakers and the alternating-current time-element relays on the incoming 12,600-volt line



The automatic control relays for the mercury-arc rectifiers are located on the main switchboard. At the right are the graphic watt-hour meters

ured between the incoming 12,600-volt a.c. lines and the d.c. bus, including the transformers and all auxiliaries, were as follows: At 1¼ load, 93.5 per cent; at full load, 94 per cent; three-fourths load, 94 per cent; half load, 93.5 per cent; quarter load, 91.4 per cent. For the period between Feb. 15 and Feb. 28 the ratio of total output of the station to total input was 89.2 per cent. During this period the load factor was very low and there was relatively little time that the rectifiers were carrying full load.

### Putting the Equipment in Service

After the rectifiers had been installed they were operated at greatly reduced potential to dry them out and permit the vacuum to be raised to the operating maximum. This was accomplished by means of a water rheostat load of 1,000 amp. at 89 volts, which was continued for about 30 hours on each of the four rectifiers in turn. By this means the occluded gases and water vapor were driven out of the anodes.

The only difficulty of any moment that has been encountered in the operation of the station is interference with some of the telephone lines of the local system. The difficulty occurs on party lines with grounded equipment. In some instances there is a high-frequency note, which has been identified as the sixth harmonic of the alternating current wave. Through co-operation of the telephone company it is expected that the trouble will be eliminated in the near future.

A feature of operation that seems inherent during the first few months of operation of the converters is what are known technically as "backfires." While it is not possible to observe the phenomenon directly, it appears to be in the nature of a short circuit between the cathode and one or more of the anodes. When this occurs, the effect is to throw out the a.c. rectifier breaker and in some instances the incoming line breaker. This immediately extinguishes the arc and the rectifier goes back on the line within ten seconds. In no case has this momentary interruption caused any trouble. As the rectifiers remain in service these backfires are becoming less pronounced, and experience with rectifiers in other installations indicates that in the course of a few months they will disappear entirely.

The rectifying apparatus was manufactured by Brown, Boveri & Company of Baden, Switzerland, and the American Brown Boveri Company of Camden, N. J. The installation was made by Griswold & Company, Ltd., of Montreal, while the layout, general engineering and building design were carried out by the engineers of the Montreal Tramways. The cost of the substation building and land, complete with equipment, was approximately $140,000.

## Data on Rochester Property Reveals Railway's Importance

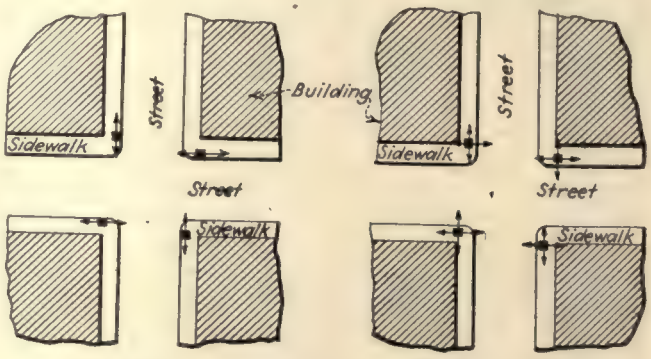
EVIDENCE of the important rôle of a railway industry in the life of a community is seen in the 1926 activities of the New York State Railways in Rochester. These lines purchased materials and supplies totaling $843,171 in the city and paid the following taxes: $43,729 on real estate, $143,980 on special franchise, $7,056 on sprinkling, $41,078 for snow removal and $166,371 for paving.

There are 1,700 employees on the Rochester lines of the New York State Railways and the payroll annually totals $2,841,840.

## Chicago's Traffic Lights Shine Four Ways

FOLLOWING nearly a year's experiment with the co-ordinated lights installed in the Loop at Chicago, the city determined that better results would be possible if the signals were displayed in all four directions and the change was effected overnight late last year. As originally installed, each traffic standard was designed to exhibit signals in two directions only, as shown in the upper diagram. Pedestrians who congregated at the curb about to cross could not readily observe whether the traffic signals were green or red unless they looked diagonally across the intersection. The change effected was to install additional sets of lamps on the heretofore blank sides of the signal units so that now the signal is exhibited from all four sides of each standard. This has been found an improvement, principally in the aid of pedestrian traffic at the intersections. At present there is no ordinance in Chicago compelling pedestrian observance of traffic signals. Traffic police are urging observance, however.

Typical signal light standard in Chicago Loop as it now appears changed to shine in four directions




Typical street intersection in the Chicago Loop

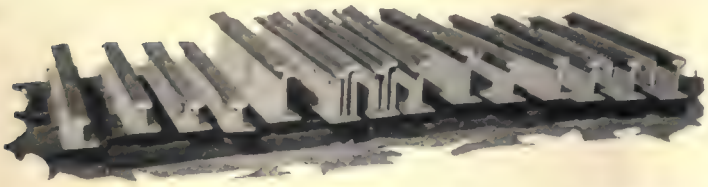
The view at left shows the location and direction in which the signals were exhibited in the original installation. The view at right shows the situation after the change made by adding lights so that the signals would be shown in all four directions, chiefly to aid pedestrian traffic.

The lamp pedestals were made in standard units so that by removing blank plates on the sides and substituting reflectors, lamps and hoods the new lamps were readily installed.

An article on the co-ordinated lights in the Chicago Loop district appeared in the March 27, 1926, issue of the JOURNAL.

# Base Plate Joint Developed by Eastern Massachusetts Street Railway

*By Frank B. Walker*
Chief Engineer Eastern Massachusetts Street Railway, Boston, Mass.



Some of the special welded rail joints made by the Eastern Massachusetts Street Railway and tested in the Riehle machine at the Massachusetts Institute of Technology

**Bending tests show average strength to be approximately equal to or greater than that of fish plate joint. Internal stresses due to heat are eliminated. Cost greatly reduced. Repair of broken rails simplified**

EXPERIMENTS recently made by the Eastern Massachusetts Street Railway lead us to believe that a simple rail joint using only a single welded base plate can be built adequately strong at about one-half the cost of a fish plate joint. During the course of our experiments we have welded and broken in a testing machine a large number of joints of various designs. Data from these tests are presented in this article for constructive criticism and in the hope of encouraging experimentation by others. We realize, of course, that the relative durability of the new and old joints can be determined only after actual installation in track, but we feel that the new type has great possibilities.

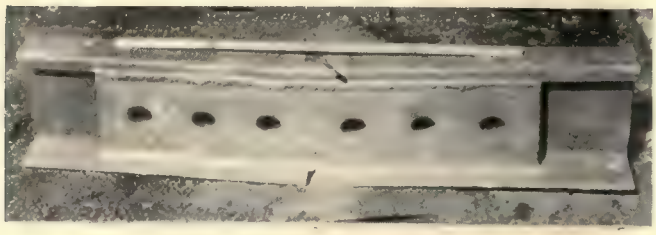
Undue importance frequently has been attached to strength in a welded rail joint. Nevertheless, strength tests are the only quick means of comparing different types of joints. We know that fish plate joints for 9-in. grooved girder rail, 7-in. high tee rail and 75-lb. low tie rail are strong enough. We have over 110,000 of these joints in our tracks, and since 1921 we have had a breakage of less than one joint per 1,000 per year on the 9-in. and 7-in. rail. In bending tests with 30-in. span, our welded fish plate joints on 75-lb. rail carried an average of 80,600 lb. Among the many joints of this type on our property failures have been extremely rare. Even the weaker joints on old 48-lb., 56-lb. and 60-lb. rails have given us very little trouble. The yearly rate of failures of all standard fish plate joints in service has been about three-tenths of 1 per cent. Each year's record has been better than that of the preceding year. We believe, therefore, that the strength developed by the present joints may be considered sufficient.

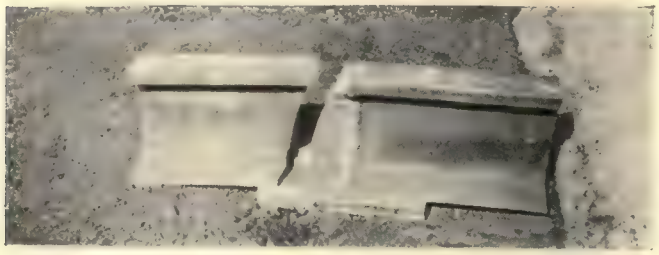
Although strong enough, the present joints do not make efficient use of the available metal. Wheel loads on a suspended rail joint cause compression in the head and tension in the base. Wheel loads on a supported joint cause tension in the head and compression in the base. In either type there is little stress in the web. The metal in the fish plates, therefore, is poorly placed to do its work efficiently. As we nearly always suspend our joints between ties, a welded base plate provides metal where it will carry the tension most efficiently.

The use of base plates in addition to fish plates in welding joints is common practice. We have used them from time to time on our system, but we never con-

Base plate joints developed by Eastern Massachusetts Street Railway

At top, 9-in. grooved girder rail with 1-in. x 7-in. x 16-in. plate.
In center, 7-in. tee rail with 1-in. x 7-in. x 16-in. plate.
At bottom, 75-lb. tee rail with ⅞-in. x 7-in. x 16-in. plate.





**Seven-inch tee rail joints tested on 20-in. span**

At top, joint with two ⅞-in. x 28-in. fish plates started to yield at 200,000 lb. At 275,000 lb. deflection was so great that load was removed, leaving a permanent set.

At bottom, joint with ¾-in. x 7½-in. x 10-in. base plate broke at 286,000 lb.

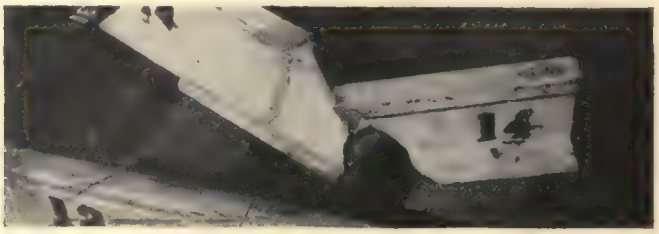
sidered that the strength added by a base plate was worth the extra cost. Nor did it seem wise to complicate a joint already strong enough to meet our needs. Use of a welded base plate without fish plates, however, has not been widely tried and we determined to experiment with this design in the hope of securing a joint of adequate strength and low cost.

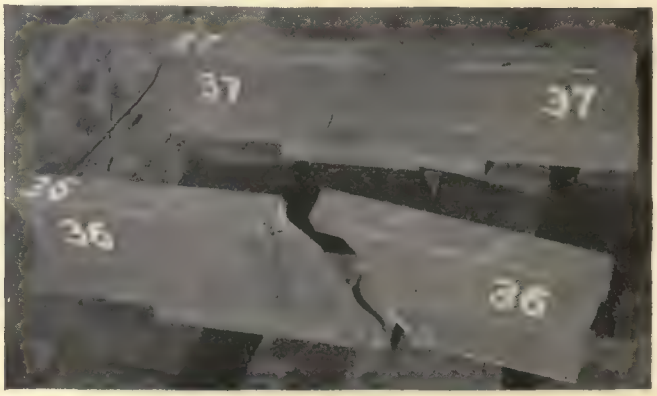
So far our tests seem to indicate that the best joint of this sort is one having a base plate ¾ in. thick, 7 in. wide and 28 in. long or ½ in. x 10 in. x 28 in. with double bead welding on adjoining webs and flanges. The 28-in.

**Standard joints Nos. 18, 19, and 38 with ⅞-in. x 36-in. fish plates on 9-in. grooved girder rail failed at an average load of approximately 274,440 lb.**

**Joint on 7-in. tee rail without base or fish plates broke at 177,500 lb. on 20-in. span**

**Standard joints Nos. 16, 17, 34 and 35 with ⅞-in. x 36-in. fish plates on 7-in. high tee rail failed at an average load of 169,000 lb.**




**Joints Nos. 14, 36 and 37 with 1-in. x 7-in. x 16-in. base plate on 7-in. high tee rail failed at an average load of 177,220 lb.**

GENERAL SUMMARY OF BENDING TESTS

| Rail | Load at Yield, Pounds: Fish Plate Joint | 16-In. Base Plate Joint | 36-In. Base Plate |
|---|---|---|---|
| 9-in. grooved girder... | 266,300 | 246,500 | ..... |
| 7-in. high tee..... | 163,750 | 177,750 | 307,750 |
| 75-lb. tee..... | 80,600 | 110,000 | 135,500 |

length eliminates two tie plates. Rail heads are kept in contact to provide for compression. Together, the beading and the base plate take the shear and tension caused by temperature changes.

### Base Plate Joint Shows Strength Equal to or Greater than Fish Plate Joint

This joint is at least equal in strength to the fish plate on 9-in. grooved girder rail and superior to it on 7-in. and lighter tee rail. Even in the event of reversal of stresses, this type of joint seems strong enough, as indicated by a test wherein a load of 75,000 lb. was carried with the joint upside down. Data presented in an accompanying table and the photographs reproduced show in detail the results of our experiments. The results of the bending tests are summarized in the tables on this page.

SUMMARY OF TESTS ON 9-IN. GIRDER RAIL

*Standard Joint with ¾-In. × 36-In. Welding Bars; Top and Bottom Seams*

| Test No. | *Cost | Load in Pounds: Yield Point | At Failure | Remarks |
|---|---|---|---|---|
| 18 | $5.59 | 285,000 | 287,500 | Broke through plates, at center on one side, through bolt holes on other. |
| 19 | 5.75 | 225,000 | 313,000 | Deflected 11/16-in. but did not break. |
| 38 | 6.33 | 222,700 | 222,700 | Broke plates through bolt holes. |
| Average.... | $5.89 | 266,300 | 274,440 | |
| *Joint with 1-In. × 7-In. × 16-In. Plate Welded to Base and Web; Base of Joint Seam Welded* | | | | |
| 11 | $2.70 | 240,000 | 240,000 | Broke through welding. Seams very light. |
| 12 | 2.70 | 292,000 | 292,700 | |
| 20 | 2.30 | 256,800 | 256,800 | Broke rail from joint at head to end of base plate. |
| 41 | 1.20 | 197,100 | 197,100 | Broke through rail outside of base plate. |
| Average.... | $2.23 | 246,500 | 246,600 | |

*Costs include all labor and material except rail.

SUMMARY OF TESTS ON 7-IN. TEE RAIL

*Standard Joint with ¾-In. × 26-In. Welding Bars; Tops and Bottoms Welded.*

| Test No. | *Cost | Load in Pounds: Yield Point | At Failure | Remarks |
|---|---|---|---|---|
| 16 | $4.12 | 145,000 | 159,000 | Did not break. |
| 17 | 4.12 | 150,000 | 177,000 | Did not break. |
| 34 | 4.18 | 184,800 | 184,800 | One plate broke at joint. |
| 35 | 4.21 | 155,200 | 155,200 | Broke through plates at joint. |
| Average.... | $4.15 | 163,750 | 169,000 | |
| *Joint with 1-In. × 7-In. × 16-In. Plate Welded to Base and Web; Base at Rail Welded* | | | | |
| 14 | $2.05 | 269,200 | 269,200 | Broke rail from rear joint at head to near end of plate at base. |
| 36 | 1.54 | 134,350 | 134,350 | |
| 37 | 1.93 | 128,100 | 128,100 | |
| Average.... | $1.84 | 177,220 | 177,220 | |
| *Joint with 1-In. × 7-In. × 36-In. Base Plates* | | | | |
| 28 | 3.48 | 303,000 | 362,500 | Defl. 1⅛ stretched plate |
| 29 | 3.67 | 312,500 | 358,000 | |

*Costs include all labor and material except rail.

SUMMARY OF TESTS ON 75-LB. RAIL

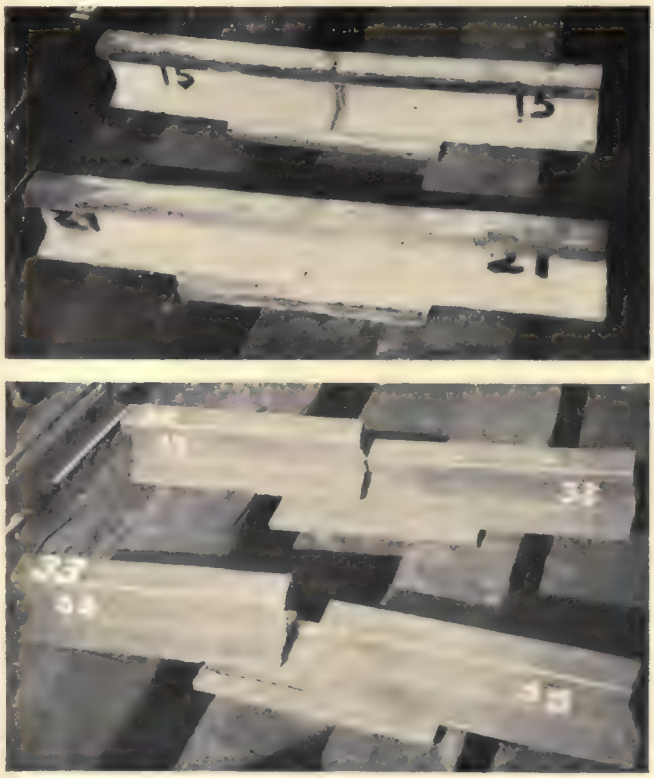
*Standard Joint with ¾-In. × 24-In. Welding Bars; Top and Bottom Welded*

| Test No. | *Cost | Load in Pounds: Yield Point | At Failure | Remarks |
|---|---|---|---|---|
| 22 | $3.11 | 77,600 | 77,600 | Deflected 1-in. but did not break. |
| 23 | 3.11 | 81,400 | 81,400 | Did not break. |
| 30 | 3.13 | 82,700 | 82,700 | Broke through plates. |
| Average.... | $3.12 | 80,600 | 80,600 | |
| *Joint with ¾-In. × 7-In. × 16-In. Plate Welded to Base and Web; Base of Rails Welded* | | | | |
| 15 | $1.86 | 124,700 | 124,700 | Cracked through welding, seams very light (single). |
| 21 | 1.98 | 120,000 | 120,400 | |
| 32 | 1.49 | 99,000 | 99,500 | |
| 33 | 1.94 | 96,000 | 97,900 | |
| Average.... | $1.82 | 110,000 | 110,600 | |

*Costs include all labor and material except rail.

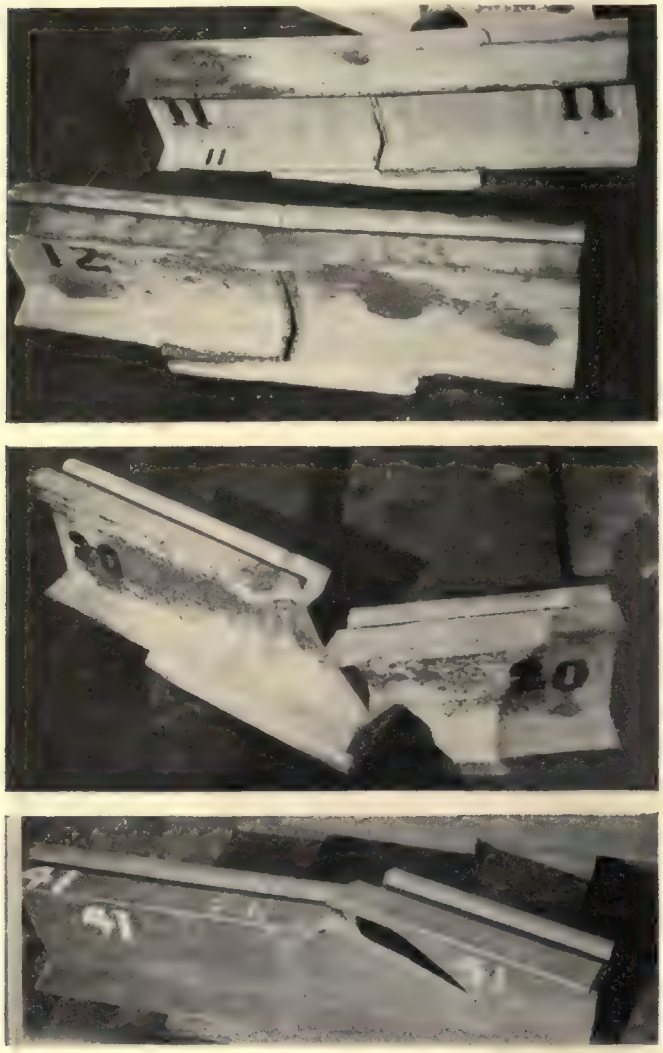
Standard joints Nos. 22, 23 and 30 with ¾-in. x 20-in. fish plates on 75-lb. tee rail failed at an average load of 80,600 lb.

The bending tests were made at the Massachusetts Institute of Technology by Prof. H. W. Hayward and the writer on the 400,000-lb. Riehle machine. While in some instances the distance between supports was 20 in. and in others 30 in., the data included in this article are for the 30-in. span only, as it appeared that the influence of shearing stresses was too great for satisfactory results on the 20-in. span. Tests on this span, however, showed that the base plate was strong enough to break the rail.



Joints Nos. 15, 21, 32 and 33 with ¾-in. x 7-in. x 16-in. base plate on 75-lb. tee rail failed at an average load of 110,600 lb.

Our series of test joints were made with three types of rail, 9-in. girder section 104-401, 7-in. high T-section 91-282 and 75-lb. T-section A.S.C.E. Welding was done by this company with the metallic arc, using a $\frac{5}{32}$-in. rod and by the Thomson Research Laboratory of the General Electric Company with the hydrogen or shielded arc. Eight kinds of joints were made: (1) Rails V'd out and welded together without plates; (2) with fish plates only; (3) with 6-in. x 6-in. x $\frac{3}{4}$-in. base plate only;



Joints Nos. 11, 12, 20 and 41 with 1-in. x 7-in. x 16-in. base plate on 9-in. grooved girder rail failed at an average load of 246,600 lb.

(4) with $7\frac{1}{2}$-in. x 10-in. x $\frac{3}{4}$-in. base plate only; (5) with 7-in. x 16-in. x $\frac{3}{4}$-in. base plate only; (6) with 7-in. x 16-in. x $\frac{7}{8}$-in. base plate only; (7) with 7-in. x 16-in. x 1-in. base plate only; (8) with 7-in. x 36-in. x 1-in. base plate only. No pressure was put upon the rails before or during the welding to bring the heads under compression. The short sections of rails were simply laid together on ties and the plates welded in the usual way, on alternate sides to relieve stresses.

Two joints on 7-in. tee rail with 7-in. x 36-in. x 1-in. base plates were tested. The first had a yield load of 312,000 lb. and carried a maximum load of 358,000 lb. The second had a yield load of 303,000 lb. and a maximum load of 362,000 lb. These loads are almost double those carried by the fish plate joints and the 16-in. base plate type. The results of these two tests lead us to believe that a 7-in. x 28-in. x $\frac{3}{4}$-in. base plate joint will have adequate strength for all practical purposes. We are proceeding with the installation of this type joint in our track.

Some of these joints were made with single and some with double beads. The work was done at two locations by different welders. This variation was intentional in order to secure a wider range of data. Some were made with good and some with poor head contact. Welding was carelessly done on a number of joints. Some joints were made with head welds and in others the webs of the flanges were welded together. For example, one had no welding on the web and was so cut that the rails were separated about $\frac{1}{4}$ in. The head was sawed at a slight angle so that there was only a partial contact. Others had no head contact when welded, but the head gap was later filled in with thin steel inserts.

It will be noted that in the tests on the standard

Two joints on 7-in. tee rail with 7-in. x 28-in. x $\frac{3}{4}$-in. base plates carried maximum loads of approximately 360,000 lb.

fish plate type of joint there were no rail failures, whereas on the base plate type a number of the rails failed. Failure of the rail itself shows that it is weaker than the joint and therefore the rail failures with base plate joints indicate that these joints are stronger than the fish plate joints which did not cause rail failure. As a result of observing the actual tests and the character of the failures, we believe that they were tension failures due to bending, although there may have been a combination of bending and shearing.

Our experiments lead us to the conclusion that the base plate joint has great possibilities. In addition to the advantage of low cost, it has the added virtue of eliminating internal stresses due to heat, a serious fault in the welded fish plate joint. Moreover, as a result of our tests information has been secured which will enable us to repair broken rails with greater confidence than was possible heretofore.

## Suggests Eliminating Parking in Downtown Grand Rapids

GRAND RAPIDS, Mich., is considering its traffic congestion problems and the important factor of parking in the downtown district. Much research has been carried on in safety and traffic circles regarding the solution of the problem and Safety Director Sinke is studying the theory of Fred M. Deane, a business man of the city. Mr. Deane's decision is based on the belief that 75 per cent of the automobiles parked downtown are not needed during the business day and deprive others of valuable space in the crowded area.

# Maintenance Notes

## Street Congestion Increases Car Repairs

By F. E. Geibel
Assistant Superintendent of Equipment
Pacific Electric Railway, Los Angeles, Cal.

With additional traffic, the number of flat wheels on our lines has increased considerably during the last few years. A high braking per cent is desirable in order to prevent accidents. Even with brakes in good condition, much depends on the speed, condition of rails and motormen in keeping down the flat wheel expense.

Traffic congestion has also added considerably to control maintenance cost. The following of traffic necessitates throwing the controller drum on and off many more times than if the track were clear ahead. This throwing off of power is usually during the acceleration period or at slow speeds when the current is high and so the burning of contacts is increased. The braking of these high currents causes arcing at the contact tips and results in heavy renewals.

Fender expense is another item that has been increased considerably with street congestion. Frequently on our system it is found necessary to take off 50 or 60 bent fenders a day for repairs. This expense for fender repairs amounts to $15,000 a year. Another expense is that for keeping dash signs in condition. These are subject to considerable abuse and increased traffic congestion has made repairs necessary at more frequent intervals.

*A car clean a day will keep the health officer away.*

Street congestion also makes it necessary to clean cars at more frequent intervals. Daily cleaning is now done on our system at many points. The general cleaning consists of a thorough washing, both inside and out, at which time trucks and equipment underneath the car are sprayed with paint.

## Chart Shows Progress of Paint Shop Work

Just how many cars are in the Waterbury paint shop of the Connecticut Company, what cars they are, and the length of time they have been there, can be told by a glance at a chart hanging on the wall of the office of W. S. Dixon, division master mechanic. For this purpose a large sheet of cross-section paper is used. Each vertical column represents a day, and each horizontal line a car. Series numbers of cars are listed at the left. When a car enters the paint shop a heavy red line is drawn across the column for that day, opposite the number of the car. This line is continued day by day as long as the car remains in the shop. When it leaves, the line is terminated. Bus painting is charted in the same way as car painting, on the same sheet. Notations are made to account for any unusual lapse of time while a vehicle is in the paint shop. When a number of weeks have passed and the lines on the chart have become distant from the car numbers at the left-hand edge, a new column is begun in the middle of the sheet. This chart not only shows

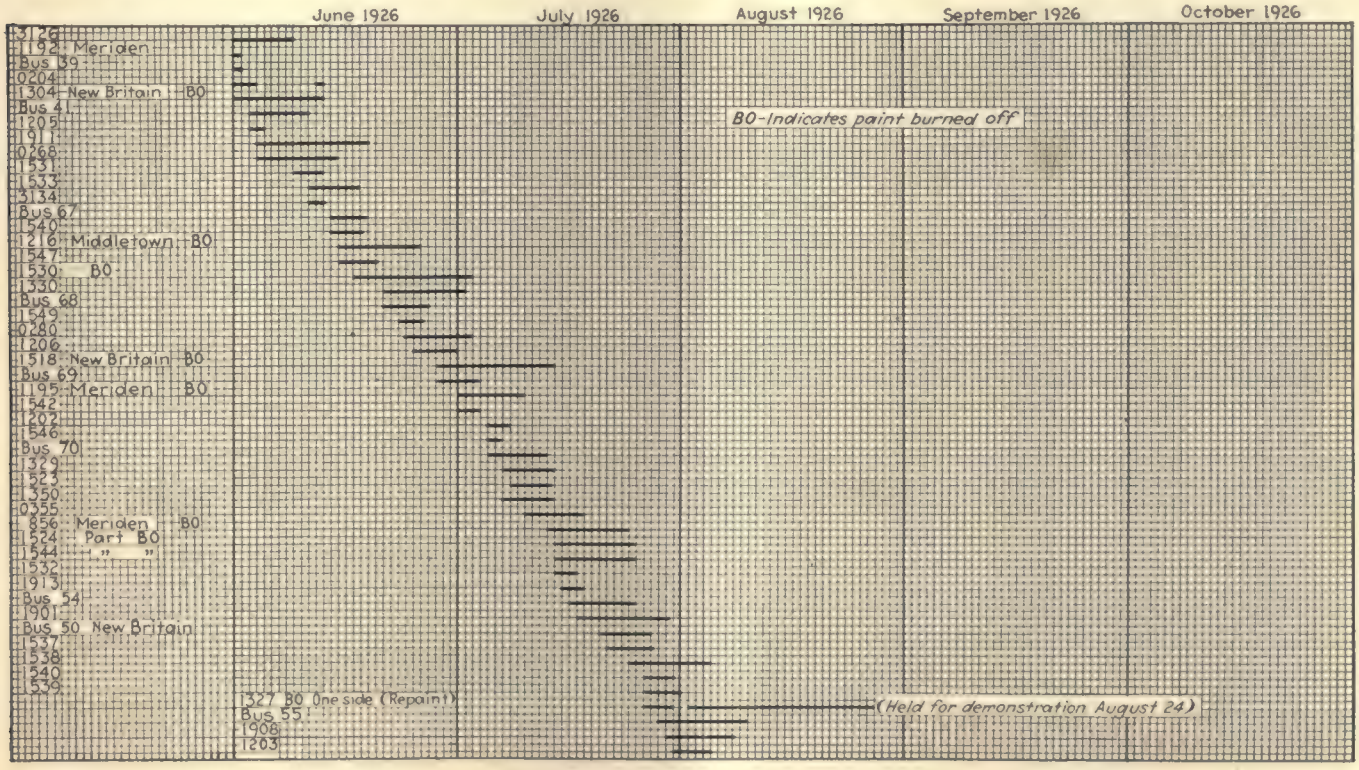



Chart showing day by day the cars and buses in the paint shop of the Connecticut Company at Waterbury

existing conditions in the paint shop, but serves also as a permanent record of the work done.

## Smooth Surfaces an Aid to Tight Bearings

By John S. Dean
Renewal Parts Engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

QUITE commonly loose armature bearings in service turn and shut off the oil feed. Operators seem to depend entirely upon the keys or dowels to keep bearings from turning and do not give sufficient attention to the pressed fit that is desirable when a bearing is placed in its housing. There are a number of reasons why these bearings lose their fit in the housing, but the principal one is that a smooth-fitting surface is not provided when the bearings and housing are first machined for installation.

The importance of machining the outside of bearing shells and in the inside bore of the bearing seat in the housing so as to provide a fine, smooth finish cannot be emphasized too strongly. This is essential to get a tight fit of the bearing and to provide the proper initial allowance which will permit of frequent removal of the bearing shells for rebabbitting and reinstallation. With a smooth machined surface, a good metal-to-metal fit and a large contact area will be obtained.

Of two bronze bearings with $\frac{1}{16}$-in. lining of babbitt for a railway motor the one on the left with a poorly machined surface will not maintain a good fit, while that on the right with polished surface will remain tight in the shell

If the surfaces are left rough for the press fit the bearing shell may be tight when first assembled, but after it has been pressed out for repairs the high spots will be sheared or torn off and the allowance for press fit will be destroyed. Then when the bearing is replaced in its housing a loose bearing shell will result. The accompanying illustration shows two bearings. The one on the left has a rough finish and is an improper job of machining. The one on the right has a relatively fine finish with a smooth polish.

Experience with wheels and gears has shown that if the finished surface of the bore is machined smooth, when they are pressed on car axles no keys are needed to keep them from turning. In order to provide the smooth surface desirable many railways grind the gear and wheel seats in order to get a good tight dependable press fit.

It is the practice of manufacturers

# *An Opportunity* to Serve and Profit

**First Prize, $200** **Second Prize, $100**
**Third Prize, $50** **Twelve Monthly Prizes, $25 each**

ENTER the Electric Railway Journal contest at once. Send in as many of your maintenance ideas as you like. The Journal will pay $5 for each item published, whether it wins a prize or not.

Any employee of an operating electric railway or electric railway bus subsidiary may compete for the prizes to be given by Electric Railway Journal for short maintenance items. Full information is given in the April 16, 1927, issue, pages 700-701.

The author does not necessarily have to be the originator of the idea or device. An article may be submitted by several persons or by a department and need not be written by the person in whose name it is submitted.

Articles may treat of any maintenance practice or device used by any department of an electric railway and should be preferably 100 to 200 words in length and accompanied by one illustration. Brevity consistent with a proper presentation of information will be given weight in judging articles. In no event should they be longer than 400 words with more than two illustrations.

Manuscripts should be mailed to the editor of Electric Railway Journal, Tenth Avenue at 36th Street, New York, N. Y. To be eligible for the capital prizes, the envelope must bear a postmark dated before Aug. 1, 1927.

In addition, a prize of $25 each will be awarded each month, beginning with the May 21, 1927, issue. Articles submitted will be published in the Maintenance Data Section of Electric Railway Journal.

If sketches accompany the manuscripts they may be in pencil, or blueprints will be accepted. Each item submitted should bear the name or names of the individual or individuals by whom it is submitted and to whom awards are to be made.

The announcement of the winner each month will be made in the issue devoted to maintenance and construction, the third issue of each month, following the one containing the item.

The winners of the capital prizes will be announced in the Annual Convention Number of Electric Railway Journal, to be published in September, 1927.

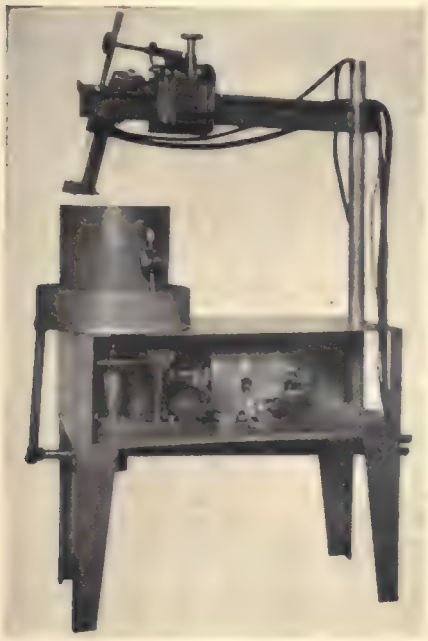
Maintenance men, here is your opportunity! The more items you send in the more chances you have of winning a capital or monthly prize. Get started at once. Articles published in the Maintenance and Construction Issue for May will have the first chance to win one of these prizes.

of modern railway motors to machine to a smooth finish the outside of bearing shells and the bores for the bearing seat in the housings. This practice should also be followed by the railways themselves for any work of this nature which they do, as it is essential to secure the maximum metal contact and so retain a good press fit in assembly.

# New Equipment Available

## Machine-Driven Arc Welder

RAPID extension of the field of usefulness of electric arc welding has induced manufacturers of this type of equipment to bring out many new and interesting welding machines. The accompanying illustration shows a new carbon arc welding machine built by the Lincoln Electric Company, Cleveland, Ohio, which is cooled by water circulating in tubs around the revolving table. The machine will weld circular seams with diameters up to 12 in. The piece on which the welding is done may be partially or totally immersed in water during the welding operation.



Carbon arc welder has cooling tubs around the welding work

The cooling arrangement used was developed to meet the requirements when welding high grade alloy steels on which the heat disturbance due to the welding must be reduced to a minimum. For 12 per cent manganese steel the welding may be done with the piece totally immersed in water and the arc submerged. This cooling arrangement is well adapted to the welding of manganese steel, since the rapid quenching of the molten metal gives it the physical properties expected in 12 per cent manganese steel. The frame and details of the machine are all made of welded steel.

## Many Improvements in Small Milling Machine

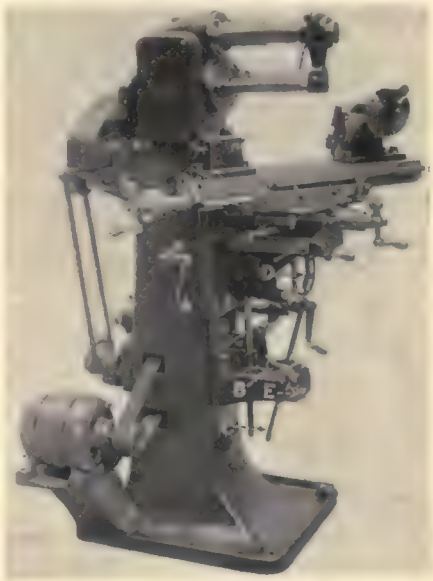
INCORPORATING many novel features, the Artisan Manufacturing Company, Cincinnati, Ohio, has recently placed on the market a small universal milling machine, with a table travel of 14 in., cross-travel of 5 in. and knee elevation of 11 in.

The machine, as shown in the illustration, has a self-contained countershaft mounted on the right-hand side provided with single friction pulley, which also serves as a brake. When belt-driven, power is transmitted directly to the friction pulley from the drive pulley on the line-shaft, and a ½-hp. motor is mounted on a housed bracket bolted to the friction clutch pulley. Handle *A* controls the friction and brake, thus enabling the operator instantly to start and stop the spindle from his regular position.

A three-step cone pulley carrying a 1¼-in. belt is attached to the countershaft and transmits its power to another cone pulley on a jackshaft which rotates more than twice as fast as the spindle. This jackshaft is offset from the spindle and runs in bronze bearings. Its speed produces a high drive-belt velocity and gives the spindle more than double the amount of torque obtained by mounting the pulley directly upon it. A sliding backgear, intermediate of the jackshaft and spindle, provides six spindle speeds.

The spindle has tapered bearings and the spindle nose is threaded. A feed gear in the rear end of the spindle operates through a reverse plate, thus providing power feed to the table in either direction. The reverse plate has gear changes which, with the three-step cone feed pulley, permit of six feeds. The feed belt drives a lower feed cone which is swung in a bracket for taking up belt slack. This lower feed cone drives shaft *E*, which passes through the column and carries a steel worm which engages worm-wheel *B*, through which passes feed shaft *C*. Feed shaft *C* is universally driven within worm-wheel *B* and the upper half of universal joint *D* and is provided with a snap socket so that it can be attached readily for driving either the table or the cross feed. The illustration shows the cross feed in use, and an adjustable dog on the bar seen just below the saddle automatically trips this feed in either direction. The saddle is square-gibbed with narrow guideways having a tapered gib for sidewise wear.

The table has a working surface of 6 in. x 18 in. and may be swiveled to a 45-deg. angle. The table feed shaft, seen directly back of *D*, receives power from it when attached,



No. 6 Artisan universal milling machine

and an adjustable dog automatically disengages the table feed. The table feed screw is arranged to receive change gears for driving a dividing head in spiral milling, and self-locking micrometer dials, graduated in thousandths, are provided for table, saddle and knee adjustments.

The machine, without motor, weighs 650 lb. and is adapted to light toolroom work. The power cross feed makes it particularly valuable for jig boring. Regular equipment includes over-arm, ⅞ in. arbor, oil pot and necessary wrenches, but a complete line of extra attachments, such as dividing head, graduated swivel-base vise, oil pan, pump and piping, is obtainable at slight additional cost.

# Association News & Discussions

## Southwestern Association Meets in Historic New Orleans

### President Sawyer and Managing Director Storrs of the American Association Tell How to Improve Conditions in the Electric Railway Industry

"TODAY is a different day in the electric railway industry," declared President W. H. Sawyer of the American Electric Railway Association, speaking before some 500 delegates and guests who braved threatening flood conditions to attend the joint convention of the Southwestern Public Service Association and the Southwestern Geographic Division, N.E.L.A., held at New Orleans, La., on April 26-29.

An appropriate setting for the story of today's electric railway situation was afforded by the South's picturesque Queen City, located within one of the very coils of the mighty Father of Waters, which is both the city's pride and terror. While the great river, gorged with the rainfall of 31 states, lashed at its confining levees and threatened to overwhelm man and his works, there was staged before the very eyes of the utility men a heroic struggle against the forces of destruction. Here, then, was an inspiring setting for a stirring call to action which was sounded by both President Sawyer and Managing Director Storrs in speaking before the assembled utilities regarding the electric railway industry's outlook.

#### Conditions Have Changed, Said President Sawyer

"Conditions of today are different from those under which we built and learned to operate electric railways," said President Sawyer. Under these conditions there is need for a different kind of men; for a different kind of thinking. The solution of our many problems requires experts—specialists. The methods of the past are no longer effective.

"But in the very difficulties of the job to be done lies the inspiration for us all. We have made some progress—are making progress, but we have only started. There is in the electric railway industry today an unlimited demand for skill and initiative. Are we doing the best job that can be done to meet today's changed conditions? Are we doing the best we know how to do? Are we taking advantage of the progress made by others and applying to our problems the methods which have already achieved improvement under like situations on other properties? Until we do all these things we are not doing today's electric railway job. That job requires the best that is in us. The very difficulties with which we contend afford us inspiration. In the solution of our baffling problems lies the greatest opportunity that was ever offered to the men of an industry.

"Hard luck stories have no place in the discussions of electric railway men. We make no progress in bemoaning the difficulties through which we have come or those which lie ahead. The day of consoling ourselves with hard luck stories has passed. With the coming of this new day our eyes are turned to the front and there is courage and hope in our hearts. Electric railway transportation has come through a fire of adversity which has tested the very core of the industry. Despite all of our difficulties; all of our burdens and all of the obstacles to progress which still lie in our path, one incontrovertible fact stands out above everything else. The very life and progress of modern communities depends on the provision of adequate and efficient public transportation. In the foundation-shaking test to which present transportation agencies have been subjected nothing has been found to take the place of the electrically propelled rail-borne car for moving masses of people rapidly and efficiently between their homes and their occupations.

"Transportation is a vital community requirement. The roots of our industry are buried deep in the foundation of community prosperity and growth. We have cause to be proud of our jobs and have every reason for throwing our spirit and our energy into the work of keeping abreast with the march of progress. Conditions are changing—yes, changing, not yearly or monthly, but daily. We are public servants in the true sense of the term and by dedicating ourselves to the community's interest we aspire to that greatest of achievements—the service of mankind. The electric railway industry must and will go forward."

Utility men, power and light as well as railway, were urged by President Sawyer to take an interest in the electric railway situation because of its relation to community development and consequently to the growth of their own business. An abstract of Mr. Sawyer's address before the joint session will be published in a later issue.

In direct line with the same thought Mr. Storrs said that electric railways are becoming convinced that they cannot sell 1910 service in 1927.

"The success of the industry," he said, "depends on attracting enough additional revenue over the minimum which comes from necessity riding to put transportation on a profitable basis."

#### Modernization in All Lines Urged by Mr. Storrs

Mr. Storrs joined with President Sawyer in urging modernization of equipment, methods and thought. He urged upon railway men their responsibility for taking the lead in the study and relief of traffic congestion. As the representative of 75 per cent of the people who use city streets he held that the transportation company must provide talent and initiative for joining with public and civic representatives in the relief of the serious situation brought about by growing traffic congestion. An abstract of Mr. Storrs'

### COMING MEETINGS OF *Electric Railway and Allied Associations*

*May 3-5*—United States Chamber of Commerce, annual meeting, Washington, D. C.

*May 6*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

*May 9*—National Conference on City Planning, Washington, D. C.

*May 11-12*—Central Electric Railway Master Mechanics' Association, meeting, Webster Hall Hotel, Pittsburgh, Pa., 9 a.m.

*May 18-19*—Central Electric Traffic Association, meeting, Tuller Hotel, Detroit, Mich., 9 a.m.

*May 31—June 1-2*—Canadian Electric Railway Association, annual convention, Winnipeg, Man.

*June 6-8*—American Association of Engineers, annual convention, Tulsa, Okla.

*June 19-23*—International Street and Interurban Railway Association, annual conference, Copenhagen, Denmark.

*June 24-25*—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

*June 29-July 1*—Central Electric Railway Association, summer meeting, Book-Cadillac Hotel, Detroit, Mich.

*June 30-July 1*—Tramways and Light Railways Association, annual meeting, Bath, England.

*July 27-29*—Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.

*Oct. 3-7*—American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio. Exhibits open Oct. 1 at noon.

address before the joint session of the two associations will be published in a latter issue.

A tribute to the efficiency and spirit of co-operation displayed by the New Orleans Public Service Company was paid by Mayor A. J. O'Keefe of New Orleans in welcoming the utility men to the city. In responding, J. F. Owens said that the issue of the hour in American business is that of protecting private initiative by keeping government out of business. W. S. Vivian, Middle West Utilities Company, held that the Utilities should act in meeting the question of public ownership before it becomes an issue in the public mind. "After a subject of this kind becomes an issue," he pointed out, "there is a tendency to discredit what is said."

Activities of the two associations during the year were outlined by Harold E. Borton, president Southwestern Public Service Association, and H. B. Flowers, president Southwestern Division N.E.L.A. Mr. Flowers in his address also took occasion to emphasize the importance of refuting the theories of public ownership advocates and of adopting a vigorous policy of combating this threatened menace to the continued development of the Utility industry.

In the absence of Chairman W. H. Burke, Past-Chairman W. W. Holden, superintendent transportation lines, San Antonio, presided at the railway sectional meetings. The program was divided into general subjects of outstanding importance, each being covered by prepared discussions and comments from the floor. The subjects were as follows: "Telling the Transportation Story (a) To the Employee; (b) To the Public"; "Traffic Control"; "Modernization of City and Interurban Equipment." A supplementary report covering the discussion of these subjects will be published next week. A. B. Paterson, vice-president New Orleans Public Service Company, was elected chairman of the railway section for the ensuing year.

### Meeting Postponed

DUE to the recent death of the president of the Pennsylvania Street Railway Association, Jilson J. Coleman, the executive committee has decided to postpone to a later date the annual meeting of the association which was planned to be held in Scranton the early part of May. The date of meeting will be decided at the next meeting of the executive committee.

H. L. Mitchell, president of the West Penn Railways, Pittsburgh, has been appointed president of the association to fill the unexpired term of Mr. Coleman.

### Plans for U. S. Chamber of Commerce Meeting

FOLLOWING the usual plan, the fifteenth annual meeting of the Chamber of Commerce of the United States, to be held in Washington next week, will be divided into groups. Monday will be devoted to general sessions of the National Councilors. Tuesday there will be a general session beginning at 10 a.m. At 1 p.m. there will be a series of group luncheons with discussions on agriculture, civic development, finance, insurance and manufacturing. At 8:20 p.m. there will be a general session held jointly with the Third Pan-American Commercial Conference, at which the President of the United States will be the principal speaker.

Wednesday morning there will be a general session beginning at 9:40, devoted to business problems from the viewpoints of the various sections of the country. At 1 p.m. there will be a second set of group luncheon meetings, the topics being domestic distribution, foreign commerce, transportation and communication, and natural resources. The annual dinner will be held at 7:30 p.m. Secretary of Commerce Herbert Hoover will give the address.

Thursday morning at the concluding general session reports from the various sections will be presented, following which there will be the usual business of the session and election of officers for the ensuing year.

## American Association News

### Heavy Electric Traction

PROGRESS reports on the various assignments were considered at a meeting of the committee on heavy electric traction of the Engineering Association held in New York on April 28. Members present were H. F. Brown, chairman; A. H. Armstrong, J. M. Bosenbury, Morris Buck, W. L. Barclay, Jr., representing H. W. Cope, A. H. Daus, J. C. Davidson, J. H. Davis, E. P. Chase representing J. V. B. Duer, H. H. Febrey, J. O. Madison, M. W. Manz and L. S. Wells.

Standards will be reviewed by a subcommittee of which Mr. Wells is chairman. This will include catenary construction as distinguished from the lighter type used for trolley roads. It was agreed that Mr. Wells will confer with other committees also concerned in this work.

Considerable discussion occurred on the subject of track and third-rail bonds. It was proposed to send out a questionnaire to obtain information from which can be made a classification that may lead to a subsequent standard of bonds of this general type. Several suggestions were made regarding additional subjects for study by this subcommittee and it was agreed that these will be looked into for possible inclusion in the annual report.

An expression of opinion on the subject of the bibliography on heavy electric traction was considered. In a letter ballot the members were strongly in favor of obtaining the co-operation of the New York Public Library, which has made a proposal for the publication of the material without cost to the association. After considerable discussion it was voted to recommend to the executive committee that the library's proposition be accepted.

Mr. Armstrong reported for the subcommittee on branch line electrification. His sub-committee is obtaining material for a tabulation of costs of gas-electric rail cars and locomotives, which will be submitted at the next meeting of the committee.

A written report of the committee on train operation with articulated trains was presented by Mr. Daus. This shows information on the latest articulated units in the United States and abroad.

Information is being collected for the tabulation of electrified steam railroad mileage and electric locomotives by Mr. Cope's sub-committee, and it is planned to have the material in the hands of the members before the next meeting.

The next meeting of the committee is planned for the second week in June, the place to be decided on later.

### Noise Reduction

SPECIAL Rolling Stock Committee No. 9 on reduction of noise in car operation held a meeting at Springfield, Mass., on April 14, 15 and 16. Reports as to future plans and progress were outlined and a test was made on the new Springfield car. Members present were H. S. Williams, chairman; C. Bethel, N. R. Brownyer, C. A. Burleson, F. L. Hinman, T. H. Minary and H. L. Rogers.

In connection with the development of the noise measuring apparatus, considerable time has been spent on development of the condenser type of sound pick-up. The construction and adjustment were of such minute proportions that the apparatus did not lend itself readily to portability. In order to overcome this it was decided to use a magnetic type of loud speaker for the pick-up. Difficulty was also experienced with the previous apparatus using the micro-ammeter and it was considered highly desirable to use a recording type instrument instead of an indicating type. The apparatus was changed to use a hook-up which permits the use of a recording voltmeter to register the amplitude of the sound vibrations.

Tests which were begun last year and considered tentatively in last year's report are to be run through to completion. It is expected that the final report will contain information on gear noise.

The committee discussed new developments which have been put forward towards the reduction of noise in car operation, the most comprehensive being the truck designs of the Springfield car and that used at Joliet, Ill. Other suggestions made were for noise reduction. These included carrying the entire motor weight on springs, use of rubber supports in which the rubber is vulcanized between two steel bushings, resilient steel wheels, development of a composition brakeshoe, bolting material to the web of wheels, and use of full elliptic springs with cast-on blocks instead of the bolted scroll ends.

# The News of the Industry

## Advance of 1½ Cents for Eastern Massachusetts Men

A new working agreement has been made between the public trustees and the employees of the Eastern Massachusetts Street Railway, Boston, Mass., effective on May 2 for one year, under which the employees are to receive 1½ cents an hour increase in the basic wage rate of 62½ cents.

The blue uniform men, on the other hand, agree not to ask for time and one-half for work performed on snow plows, which was awarded them last year by an arbitration board of which Judge John C. Leggat was chairman.

The 5-cent differential for one-man car operation remains the same. More than 95 per cent of the blue uniform work is performed on one-man cars.

Under the 1926 award, the blue uniform men receive 8½ hours pay for eight hours work, but now the company promises it will make as many straight eight-hour runs as practicable and reasonable and the men agree that they will operate them with no demand for pay for work not actually performed.

With the understanding that runs of eight hours and fifteen minutes will be kept down to a minimum, the men further agree to operate them without demand for time allowance.

Seniority rights for blue uniform men which continued for six months after layoff will be extended to one year. In all other essential respects the present contract is renewed.

The new agreement was reached after a series of conferences between the company's labor representative and the wage committee of the carmen's union, composed of William O. McGowan of Brockton, John F. O'Brien of Lawrence and Thomas J. Powers of Lowell and John H. Reardon of Worcester, chairman of the executive committee of the International Carmen's Union.

By referendum vote the negotiations have been approved by the local unions in Lowell, Lawrence, Haverhill, Salem, Lynn, Chelsea, Melrose, Woburn, Quincy, Weymouth, Brockton, Taunton and Fall River.

## New Fare Scheduled for Kansas City

William G. Woolfolk, president of the Kansas City Public Service Company, Kansas City, Mo., on April 18 filed with the Public Service Commission application for authority to rearrange the schedule of fares charged by the railway in Kansas City, to make the schedule conform to promises in connection with the new franchise. The application asks that the commissioner authorize the new schedule so that it will become effective May 1.

The present schedule is 8 cents cash fare, two tickets for 15 cents, seven for 35 cents, with one-half of these rates for children between the ages of eight and twelve and children less than eight years old free. The new schedule as provided in the ordinance is a single cash fare for adults of 8 cents, two tickets for 15 cents, ten tickets for 70 cents or fifteen tickets for $1; children less than eight years old, free; between the ages of eight to twelve years old, 4 cents for single fares; four tickets for 15 cents; ten tickets for 35 cents and thirty tickets for $1, with two children without tickets to be carried at the price of one single cash fare for an adult.

# Survey of Transportation Situation in Chicago

### Prospects of Immediate Consolidation of Chicago Transit Systems Denied by Company Officials—Effect of Home Rule and Terminable Permit Uncertain

RUMORS current in the local press on April 25 that agreements had been reached between the new city administration in Chicago and local traction officials for immediate consolidation of the surface, elevated and bus lines on the basis of indeterminate franchises were later denied.

Leonard A. Busby, the Chicago City Railway president, asserted that "we have no oral agreement or understanding of any kind with any one regarding a settlement of the traction question." He said:

> We are in favor of a unification of these properties and enabling legislation which will authorize the city to grant a modern type of franchise to permit a consolidation, but so far as I know no attempt to draft or submit legislation of this kind has been made at the present session of the State Legislature.

The steady rise in prices of traction securities since the election of Mayor Thompson is probably responsible for the circulation of these misleading reports, city and company officials believe. A recent tabulation of market prices reveals that first mortgage bonds of the Chicago City Railway which sold on Feb. 1, the date of franchise expiration, at 76, and on April 6, the day after election, at 78½, are now selling at 85. Chicago Railways series A bonds in the same period have gained nearly seventeen points, or from 53¼ to 70.

#### Mayor Said to Desire Quick Settlement

Evidence that the new Mayor desires a quick settlement of the problem is found in his campaign addresses and subsequent statements. Although his advocacy of home rule is quite well known, at no time since the recent mayoralty contest was begun has he announced any definite or constructive transit program. In his inaugural address on April 11 the Mayor merely reiterated his campaign pledge to give his very best thought to the matter and intimated he would have something further to say in a later communication to the City Council.

In the meantime, however, the McCluggage and Durso bills, the former providing for the return of utility control from the state commission to all Illinois cities over a certain population and the other for local control in the city of Chicago, have been sent to a subcommittee by the General Assembly at Springfield after discussions lasting several months. The measures were vigorously opposed by representatives of the steam railroads and public utility companies of the state. The shelving of the two bills undoubtedly means that no further action will be taken in the matter during the present session of the Legislature. Defeat of Mayor Dever, who was a leader in the fight for home rule, and the failure of Chicago voters to approve the home rule proposition, together with the natural assumption that the new Mayor was unfavorable to home rule, are said to be the reason for the Legislature's sudden decision to sidetrack the bills.

Concern over the outcome of the Chicago mayoralty election, as in the case of the home rule bills, is also reported to have been responsible for the long delay in the presentation of a terminable permit bill in the Legislature at Springfield. The committee appointed to investigate the subject of indeterminate permits made its report to the Senate several months ago after an extensive junketing trip. The report declared that sentiment for such a policy was distinctly favorable wherever it had been tried out. Several members of the committee from the House of Representatives, however, declined to sign the report.

Inasmuch as home rule and the terminable permit legislation were regarded as the very essence of the negotiations for a successful traction settlement at the time the matter was dropped by the local transportation committee of the City Council last February, doubt is now being expressed as to the course of action the City Council will take. At the present time the city has no power to issue a terminable permit to the surface lines or bus lines, and power to consolidate

these lines, together with the elevated lines, into a single vast system and to bring them under local regulation must also be obtained from the Legislature. The various plans which are still pending before the transportation committee are (1) the Lisman plan, sponsored by F. J. Lisman and associated New York banking interests, involving the Chicago Surface Lines and based on a twenty-year grant; (2) the consolidation plan, advocated by the former Mayor and providing for a consolidation of surface and elevated lines on the basis of a terminable permit and home rule, and (3) the proposal made by the Chicago Motor Coach Company, which provides for substitution of buses for street cars in exclusive city-wide service. The two first plans are now in the form of tentative ordinances. At the last meeting held by the committee the companies were asked to agree among themselves on a plan of merger or working agreement with unified service and universal transfers.

While the city is awaiting action by the new Mayor and the local transportation committee, which is again headed by Joseph B. McDonough, the original Dever appointee, the date of expiration of the six months extension of Chicago Surface Lines franchises draws rapidly onward. Only a little more than twelve weeks remains for them to run. If no agreement is reached or ordinance passed before the extension lapses, on July 31, there will arise the question of valuations and many other important matters.

At the present time Samuel Ettelson, newly appointed Corporation Counsel, is making a study of the various traction plans, including subway construction projects, the result of which will be submitted to the Mayor on his return from New Orleans next week.

## St. Louis Resists Higher Fares

That the operating costs of the United Railways, upon which is based the petition for a straight 8-cent fare in St. Louis, will be materially lowered when the system emerges from receivership and the properties return to private management is contended by the city, which is resisting before the Missouri Public Service Commission Receiver Wells' latest application for higher fares. The city's protest against the higher fare was filed with the commission by City Counselor Muench on April 22. The petition of the city points out that the United States Court has ordered the sale of the company's properties on May 25.

Receiver Wells also seeks to have the valuation for rate making increased from $51,781,348 to $75,000,000 and claims that an 8 per cent return should be permitted. The present income permits only a 3.3 per cent return on the $75,000,000 and only 4.27 per cent on the $51,781,348 valuation. The city is also opposed to the $75,000,000 valuation. It contends also that the city car riders should not be forced to carry the burden for unprofitable operations in St. Louis County; that the annual depreciation charge of $1,500,000 is excessive by at least $300,000, and that the insurance reserve set up by the company is unduly burdensome.

## Change in Control Said to Impend in Oakland

Change in the control of the Key System Transit Company, Oakland, Cal., looms as the result of the election of two new directors at a meeting held on April 22. The new directors are A. J. Lundberg and Gustav Epstein. They replaced A. Crawford Greene and B. H. Dibblee, elected at the annual meeting a month ago.

Messrs Lundberg and Epstein are members of the investment firm of J. Barth & Company, large stockholders of the Key System. Barth & Company were unrepresented on the board up to last November, when H. C. Clayburg was elected a director. It is hinted that the members of this concern will now play a prominent part in guiding the financial destinies of the railroad. The size of the executive committee has been increased from five to seven members so as to include Messrs Clayburg and Lundberg.

Stock of the Key System has been declining steadily in the market during the last year, especially the prior preferred and the preferred. Moreover, the quarterly dividend on prior preferred has been passed. In announcing the decision of the directors to skip this dividend President Lester S. Ready stated:

> It has been the aim and hope of directors and the management that this would not be necessary, but the conditions that have developed during the past year have convinced them that the best interests of the company and of the stockholders will be served if this action is taken.

Mr. Ready cited as factors in the present financial status of the company the $400,000 annual increase in operation expenses through the higher wage award made by the arbitration committee a year ago; the expenditure of $6,000,000 for capital additions and betterments in 1925 and 1926 and the failure of the new revenue provided through an increase in railway and trans-bay ferry rates to meet the higher operating expenses and cost of improvements. In a statement made by him Mr. Ready said:

> It was contemplated that following the increase in rates some loss of passengers would result, but it was expected that within a few months the traffic would recover, especially in view of the added track facilities and improvements in track and equipment.
>
> To date the passenger traffic, due to material increase in ownership and use of automobiles, has not increased to an extent to offset the added costs. In addition a temporary depression of gross revenue has occurred during the first three months of 1927, owing to the more than normal rainfall.

Rumors are rife in San Francisco that the Hill interests are maneuvering to get control of the Key System as part of their transcontinental system and make their terminal in the Key mole. These reports, however, are contradicted by statements that the Key and the Southern Pacific are shortly to merge so as to eliminate present costly duplication of service.

Surveys with this object made by engineers are now being studied by the officials of both roads. An announcement centering around the Key and Southern Pacific lines seems certain in the near future.

In the meantime the Key officials are making plans for formal application for a higher fare. Hearing on this matter will come up before the Railroad Commission on May 10. At this hearing it is likely that there will be a hot fight, as John L. Davie, Oakland Mayor, who is none too friendly to the Key System, has just been re-elected for another four-year term, defeating Frank Colbourn. The latter was a member of the arbitration committee that awarded the car men of the Key System a higher wage in 1925.

## Traction Settlement Looms Again in Toledo

Action looking toward a settlement of the railway difficulties in Toledo, Ohio, may be sought before the voters at the primary election in August. Demand to this end has been made in conferences between officials of the Community Traction Company and representatives of the city administration. Recent discussion indicates that action must be taken on the contention of the Street Railway Board of Control that between $2,000,000 and $3,000,000 must be written off the capital value of the company to take care of abandonments, obsolescence and correct some of the evils in valuation adopted under the Milner plan. Concessions in the way of power rates are to be asked in return for a monopoly of bus and railway service. Following the Riggs survey two years ago an effort was continued to draft a new franchise keeping the salient factors of the Milner plan but correcting many of its defects brought to light in six years of operation.

The result of these negotiations between attorneys from the New York office of Henry L. Doherty & Company and the city law director was unfavorable to the Board of Street Railway Control, which has had direct contact with the operations during the entire life of the Milner franchise ordinance. Since this stand was taken negotiations have been intermittent, with conditions getting worse.

The city has a program of about $3,500,000 of new paving and reconstruction of streets which involves the traction company at several points. The Board of Control has asked for revision of power rates, new bus lines and extensions, and in the meantime the company has continued to lose business to private automobiles and competing independent bus lines.

After weeks of effort to arrive at a decision Service Director William B. Guitteau has had legislation introduced in the City Council providing for the repaving of St. Clair Street in the downtown district by the city if the railway refuses to go ahead with the work inside of 60 days. Abandonment of this stretch of track was recommended as a part of the Riggs plan, but J. Frank Johnson, general manager, says the abandonment can come only as a part of the general plan.

Before the City Council are three or four plans for complete bus service for the city and it is believed that they constitute one way out of the tangle in the event the railway situation is not brought to a settlement in a few months.

## Wiring Havoc in New York Subway

Fire broke out on the afternoon of Sunday, April 17, in the new subway under construction by the city of New York under Eighth Avenue. The fire started at 36th Street, damaged cables and subway construction to an extent estimated by the builders at $500,000 and almost completely stopped telephone and light and power service in a large section of the mid-town business area. Police and fire signals were put out of commission, and grave hazards faced the firemen who poured water into the excavation.

For three hours or more several large hotels were deprived of utility service, newspaper offices were hampered, at least one hospital was without electricity, and trolley service was somewhat crippled. Despite the fact that it was Easter Sunday, wiremen and other utility workmen were recruited from the forces of the telephone and light and power companies from all over the city and contiguous territory to repair damage and restore service, and the torn-up and undermined streets beneath which the new subway is to run showed even more sub-surface activity than on weekdays.

On Monday morning the fire broke out again with even worse results than the day before, paralyzing 15,000 telephones, darkening tens of thousands of electric light bulbs and stopping elevators throughout the district between 34th and 38th Streets and Seventh and Ninth Avenues. The disruption of telephone, light and power service halted business activities in the district almost as completely as if that zone had been visited by an extensive disaster. All electric power was cut off from a twelve-story department store covering most of a city block. Many business places shut down for the day or closed early, and it was estimated that twenty thousand workers were forced to be idle. In the section affected is housed a large part of the garment industry of the city. When night fell residents in side streets had to resort to oil lamps and candles and watchmen of loft buildings carried lanterns and flashlamps.

The New York Edison Company made final connections of feeder cables sufficient to carry full-capacity load of 100,000 kw. late on Tuesday evening, and when the business buildings were opened on Wednesday morning there was energy for elevators and electric lights in all establishments, but many buildings were still cut off from telephone communication.

Fire in the Eighth Avenue subway gave New York firemen a hard fight

## New Franchise Sought in Sandusky

A franchise to take the place of the one that expired nearly a year ago was submitted to the City Commission of Sandusky, Ohio, on April 18 by F. W. Coen, president, and L. K. Burge, vice-president and general manager of the Lake Shore Electric Railway. The draft was discussed behind closed doors and its provisions were withheld. It is understood, however, that it makes provision for a fare higher than 5 cents.

## "Making Transportation Pay"

"Making Transportation Pay" is the title that has been chosen this year for the digest of the presentations made by electric railways in 1926 for the Charles A. Coffin prize. This title was selected because it epitomizes the present trend of managerial thinking. The book shows that transportation is being made to pay and how it is being done.

Complimentary copies are being sent to a selected list, including public utility commissions, investment bankers and public and college libraries, as well as members of other organizations interested in the electric railway industry. A limited number of extra copies of the book are available to others at the cost price of $2.

This is the fourth volume of the series of "Electric Railway Practices" issued since the establishment of the award by the Charles A. Coffin Foundation.

This view of the second fire shows great patches of planking torn up and temporary electric cables installed

## Transportation Tied Up in Peterboro

Peterboro, Ont., is being supplied with transportation service by a local cartage company. The Peterboro Radial Railway, operated by the Hydro-Electric Power Commission of Ontario, has been closed since March 31. The city and the commission were unable to come to terms on a price for the utilities. The commission placed a price of $575,000 on the gas and railway utilities and the City Council countered with an offer of $150,000. It is desirable to sell the railway, the commission declared, because it is losing $50,000 a year, an amount borne by all hydro municipalities in the Central Ontario System. The railway is valued at $475,000, and if it is junked, which to some seems probable, this loss will have to be absorbed by the other hydro municipalities in the system.

Meanwhile the city is handicapped by lack of transportation and a further difficulty was encountered when the Mayor announced that the Hydro commission's contract with the Gotfredson Bus Corporation did not expire until May 20.

## Bill Against One-Man Cars Lost in Tennessee

One-man cars are to continue to operate in the cities of Tennessee due to the action of the House of Representatives in rejecting the bill offered by various delegations of the larger cities which would have prohibited their usage in all cities of 30,000 population or over. The Knoxville delegation, backed by the smaller counties, opposed the bill and in rejecting an amendment to permit the cars in all towns under 30,000 population brought about the defeat of the bill.

## Summer Excursion Rates Announced by South Shore

Anticipating a large volume of summer travel to Indiana Dunes State Park, newly created reservation, the Chicago, South Shore & South Bend Railroad will provide low week-end rates from Chicago. The round trip rate to Tremont, park gateway, will be $2; to Miller, $1.50, and to Wilson, $1.75, the two latter places also being popular with summer visitors to the Dunes. The tickets sold on this basis will have a return limit three days following date of sale. The South Shore Line is the only line providing regular service to these Dunes points.

## Tract on Courtesy Bristles with Interest

"Our Part in Public Service" is the title of a handsome vest pocket booklet on public relations issued by the Nashville Railway & Light Company, Nashville, Tenn.

The booklet has been distributed to 1,400 employees. It covers every phase of public relations work, both in the operating and electric accessories field. In a modest preface, J. P. W. Brown, vice-president, explains that while the principles set forth are not new, having been discussed in employee group meetings, nevertheless they are essential to the company's success.

The text matter of the little code of principles bristles with interest and attacks many new phases of contacting with the public. Of outstanding significance are the paragraphs devoted to definition of courtesy, telephone speech and the opportunities for public service.

# News Notes

**Interurban Lowers Wages.**—A reduction of 10 per cent in wages of all officials and employees of the Buffalo & Erie Railway has been ordered, effective May 1. This company operates an interurban between Buffalo, N. Y., and Erie, Pa.

**Adjustment Department Formed.**—A new department of the Kansas City Public Service Company, Kansas City, Mo., has been formed. It is known as the adjusting department. It replaces the old claim department of the company. The new department is under the supervision of Arthur T. Bagley, who will be superintendent of personnel and manager of this department for the company.

**Reprints of Interview.** — "Three Classes of Service," which appeared in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 26, 1927, has been reprinted in pamphlet form. The number now in circulation is 85,000. The article was an interview by Charles Gordon, editor of the ELECTRIC RAILWAY JOURNAL, with T. E. Mitten.

**Seeks Ten-Cent Fare.** — A petition was presented recently to the City Council of Ames, Iowa, by the Fort Dodge, Des Moines & Southern Railway calling for a 10-cent fare on cars and buses operating between the loop district and Iowa State College.

**Would Provide Study of Transit Needs.**—A bill to create a special commission to study the city's transportation needs, particularly a rapid transit system, will be presented at once to the new St. Louis, Mo., Board of Aldermen. Samuel L. Wimer, chairman of the special committee on rapid transit of the old board, will be sponsor for the new measure.

**Official Credited with Idea.**—The rebate slip for passengers who inadvertently or accidentally drop more change than is necessary in the Johnson fare boxes is being used effectively on the lines of the Southern Colorado Power Company in Pueblo, Col. The details of the idea, reference to which was made in the ELECTRIC RAILWAY JOURNAL, issue of April 9, 1927, page 669, were worked up and carried out by W. C. Porter, superintendent of transportation.

**Facts on One-Man Car Operation.**—The Toronto Transportation Commission, Toronto, Ont., has recently published in the daily newspapers a series of announcements presenting data on the one-man cars. Publishing such information is in line with the practice of the commission of taking the public into its confidence in all important developments in regard to the system. The purpose of the announcement was to correct any false impression and to win the public over to use the rear exits of the "treadle" cars and otherwise co-operate with the operators by using the car so that the service they provide might be convenient and efficient.

**One-Man Car Service Extended.**—Cars on all the lines of the Valley Railways, Harrisburg, Pa., are run now on the one-man basis, following the extension to two lines on April 18, and part of a third line which formerly had two-man operation.

**Would Elect and Not Appoint Members.**—A bill has been introduced in the Wisconsin Assembly providing for the election of Railroad Commission members instead of their appointment by the Governor, as is the case now. The bill states that at the general election on April 1, 1928, the voters shall determine by referendum whether or not Railroad Commission members shall be elected by the people.

**Seeks Ten-Cent Rate on New Line.**—The Public Service Railway will provide bus service for the lower east side of Union City between Hoboken and Grantwood, N. J., if the City Council of Hoboken agrees to a 10-cent fare for the run up the viaduct the same as on the Hillside line. This is the claim of W. H. Shepherd, divisional manager of the company, at a conference on the transportation situation at the committee of the whole session at City Hall on April 18. The proposed extension of the Hillside Line would mean the rerouting of buses of some of the present fleets. The willingness of the company to expand its service was disclosed by Mr. Shepherd. He referred to his going to that section a year ago and of an increase of 7,500 miles in daily mileage under his direction and of intention to continue that policy within reason as a means of increasing revenue for his company.

# Foreign News

**Austrian Electric Line Completed.**—Service has commenced between Woral and Innsbrück, Austria. This line, 45 miles long, is a section of the Austrian State Railroad and is part of the line included in the electrification program which has recently been completed on this system.

**New Swiss Electric Locomotives.**—The first of a new and improved type of electric locomotive has lately been turned out from the Brown-Boveri works at Munchenstein, Switzerland, for service in hauling the heavy express trains between Berne and Zurich. The engine, which runs on seven pairs of wheels and weighs 115 tons, is said to have attained a speed of more than 62 m.p.m.

**Flood Lighting at London Stations.**—According to the London Underground Railways, the experiment of flooding the stations with light is proving successful at the City and South London

Railway extension and will be introduced at the Finsbury Park station of the Great Northern, Piccadilly & Brompton Railway. Powerful searchlights are placed also on the roofs of the outdoor stations to emphasize their position.

**Railroad Electrification in Holland.**—Electric trains will soon begin to run from Haarlem to Rotterdam and Haarlem to Ymuiden in Holland. By next October it is expected that the Amsterdam-Rotterdam line will be completed.

**London County Council Re-equips Cars.**—Fifty cars in London have been re-equipped with upholstered cross seats. Operation of these cars has proved so successful that the London County Council will extend the program to 50 more cars. About 250 cars are in line to be improved. Total cost for the work will be £54,000.

**London Underground Railways to Use One Guard on Trains.**—All trains operating in the London Underground Railways will in the future have only one guard to a train. This system has been used on four and six-car trains only in the past, but according to recent official news of the Underground more men will be added to the staff to direct the traffic, and automatic devices will be substituted in place of guards. Experiment is now being made of a telephone to be used for communication between the motorman and the guard. This change of system is a process which will take at least two or three years to carry out, the time allowed for equipping all of the cars.

**Tramways Association Meet at Bath.**—Bath, England, is the meeting place chosen for the annual conference of the Tramways & Light Railways Association to be held June 30 and July 1.

**Express Buses for Manchester.**—Manchester Corporation Tramways department has started experimental express bus service to parallel each of the tramway routes. Fares on these buses, however, are twice those charged on the tramway lines, but the buses do not stop between the tramway fare zone points, which are about ¾ mile apart. The service will be linked up so that beyond the range of the tramways the buses will stop at all intermediate points and ordinary fares will be charged.

**Glasgow's Plans for New and Improved Cars.**—Purchase of 50 new cars and the improvement of 150 cars now in service were recommended by the Glasgow Town Council, and approved on April 14. The cost is estimated at £345,000. For twenty years Glasgow has made little change in car design. In the report submitted by L. Mackinnon, general manager of the Glasgow Corporation Tramways department, it was stated that the speeding up of the service in Glasgow had emphasized the necessity for bringing the cars up to date by the introduction of modern motors to give increased acceleration and retardation and higher running speeds. At the present time, according to the report, there are 1,004 Glasgow built cars in stock, including 332 constructed less than seventeen years ago, 235 built between seventeen and 22 years ago and 437 more than 22 years ago.

# Recent Bus Developments

## Right of Philadelphia to Tax Interstate Buses Upheld

The fight of the city of Philadelphia, Pa., for local jurisdiction over interstate buses has been carried to a successful conclusion in the United States District Court by James F. Ryan, Assistant City Solicitor.

The American Transit Company and the American Motor Coach System, both Delaware corporations, with local offices in Philadelphia, had obtained a temporary restraining order preventing the city from collecting the $50 fee per bus authorized by Council. P.R.T. buses, local and interstate, all pay that fee.

The city, contending that the aggregate annual collection of $12,500 for the 250 buses engaged in interstate traffic would scarcely meet the expenses of proper regulation in the public interest, went before the court in an endeavor to make a test case of the operators' action.

Judge Thompson dismissed the injunction. In ruling in favor of the city, he pointed out that the bus was a new factor in transportation. He cited increased population, narrow streets, and the occupation of roadways by buses of more than ordinary weight and size as a modern problem. These buses, he said, carrying as many passengers as possible, would become a menace to the city unless properly regulated. The court said:

> It is essential to the orderly supervision of traffic, that the route, stop, start and loading points of these interstate buses should be clearly designated. Each bus also should bear a city license plate. The designation should be filed for immediate reference in an appropriate office.
>
> A $50 fee for each bus is certainly not unreasonable, in view of the testimony from two companies that monthly receipts for twelve buses averaged between $18,000 and $20,000.

The court pointed out that Congress had not yet dealt with the interstate motor vehicles in Philadelphia, and while it might do so in the future, it was now within the province of the states to provide reasonable police regulation.

As a result of the decision abolition is likely to follow of all existing ordinances regulating passenger-carrying motor vehicles in Philadelphia and enactment by Council of a new measure providing complete police jurisdiction over interstate as well as local buses will be effected shortly.

## More Bus Substitutions in Massachusetts

The Selectmen of Ware, Mass., have granted a permit to the Conlin Bus Lines, Worcester, to connect Enfield, Ware and West Brookfield by bus. At the latter point the buses will connect for Worcester and Boston. There will be summer and winter service. The State Department of Public Utilities is expected to approve the plan so that service can start on May 1. The matter of granting a permit to the Springfield Street Railway to operate buses between Ware and Palmer was discussed by the Selectmen and it was decided to propose to the railway that it take up the rails in Ware but leave the ties in place. If the proposition is acted upon favorably by the railway the bus permit will be granted.

## Prospective Bus Line to Be Under Hamburg Railway Management

Petition has been made to the New York Public Service Commission by William D. Allen for the operation of a bus line between Orchard Park and Lafayette Square in Buffalo traversing Buffalo, East and West Quaker Streets in Orchard Park, Orchard Road in East Hamburg, Orchard Park Road and Potter Road in West Seneca to the intersection with Orchard Park Road at the Buffalo City Line. The petition states that it is ultimately planned to form a corporation for the running of the bus line, the management to be the same as that of the receiver of the Hamburg Railway. As soon as the Ridge Road is opened across the railroad east of the Lackawanna city line it is proposed to secure permission to operate buses in alternate trips over the Ridge Road to South Park Avenue and to co-ordinate this line with the service given by the Hamburg Railway. Three large railway bondholders have agreed to take sufficient stock adequate to finance the operation of the new line.

## Southern Pacific Supplements Service with Bus Auxiliary

Entering the highway motor transport field for the first time, the Southern Pacific Company on April 19 filed with the Secretary of State at Sacramento articles of incorporation of the Southern Pacific Motor Transport Company, a California corporation, to operate as an auxiliary to the railroad activities. San Francisco is named in the articles as the business center of the proposed new corporation and the purpose of the organization is outlined as being "to own, hold, control, lease, purchase, sell, operate and manage motor stages and motor trucks in streets and highways, public or private, within and without the State of California."

Speaking of the action of the company, Paul Shoup, executive vice-president of the Southern Pacific, said that the competition of privately owned machines and of bus companies in connection with the construction of good highways in the territory served had so decreased the earnings from certain trains, especially those engaged in branch-line service, as to necessitate taking off these trains. The Southern Pacific Motor Transport Company has been organized as a separate corporation with independent operation. This service will be developed as the need arises. The company will be empowered to engage in all forms of transportation.

## Would Operate Buses in Batavia

Batavia is soon to be added to the list of smaller up-state New York cities supplanting trolleys with buses. The Batavia Traction Company at a meeting of the Common Council asked permission to operate buses and discontinue its trolley system, which has served the city since 1901. The Council held the matter in abeyance pending investigation, although it is a foregone conclusion that the days of the street railway are numbered.

If the Council grants the request immediate application will be made to the State Public Service Commission for permission to make the change. Stephen W. Brown, president of the corporation, and other representatives of the railway stated that the company could no longer stand the drain on its finances in keeping the railway line in operation. The equipment consists of only four cars. Mr. Brown said that the company had lost more than $60,000 in thirteen years. It was stated that there were no funds in the utility's treasury even for current expenses and that a bus system was the only solution.

While city officials and public sentiment generally are favorable to the shift, the question of fare is to be threshed out. The present fare is 5 cents. There is some sentiment for municipal bus operation, but it is expected that the Batavia Traction Company will continue to be the city's transit agency, but with buses instead of trolleys.

## Bus Bill Signed by Pennsylvania Governor

Governor Fisher of Pennsylvania on April 18 signed the Parkinson Senate bill which permits any electric railway incorporated heretofore under the laws of Pennsylvania and owning at least two-thirds of the capital stock of any motor company or street railway now or hereinafter organized under the laws of the state to acquire the latter. Acquisition must be subject to the approval of the Public Service Commission.

## Bus a Vital Co-ordinating Factor in Detroit's Transportation

The most practical and proved panacea for the traffic and transportation ills that are at present the most pronounced growing pains of the city of Detroit is the bus. In voicing this opinion Del A. Smith, general manager of the Department of Street Railways, claims that the bus is a vital adjunct to the electric railway system. He says engineering skill has accomplished no greater or prouder task than in bringing the bus to its present high state of development.

In the Detroit *Times* of April 5 Mr. Smith outlines the phenomenal growth of the bus in general and particularly in the locality of Detroit. The department established 116 miles of bus routes in June, 1925, and is now operating more than 160 route-miles employing 310 buses for these routes. In this great wave of modernism and improvement Mr. Smith believes that the department should go slow in stocking itself with equipment that may be impractical and obsolete tomorrow. He is watching closely experiments in other cities, both in the matter of developing the bus and in meeting the competition from independent lines. Mr. Smith favors the Mayor's plan of some day taking over the Detroit Motor Bus Company's routes and equipment. He said that would be the fairest and most practical plan, but any harsh or summary action in that direction would not be fair to stockholders or in accord with the original agreement with the private company.

**Discontinuance Application Dismissed.**—The California Railroad Commission has dismissed the application of the Pacific Electric Railway for permission to discontinue a portion of its Upland-San Antonio Heights motor coach line between 24th Street and San Antonio Heights, upon request of that company.

**Seeks to Operate Bus Line.**—Authority to operate a bus line between Ogden, Utah, and the Utah-Idaho state line is asked by the Utah-Idaho Central Railroad in a petition recently filed with the Public Utilities Commission. The contemplated service would cover both freight and passengers. According to its petition the company would continue its rail service and would operate its bus lines in addition to this equipment, if granted a certificate of convenience and necessity.

**Abandons Bus Route.**—The bus route of the Worcester Consolidated Street Railway, Worcester, Mass., over Burditt Hill, Clinton and through West Boylston has been abandoned. Instead of this two-hour service by that route the Consolidated is running buses hourly through Boylston Center. The company gives as a reason for the abandonment of the line that better time can be made on the new route, which is 3 miles shorter, and there is not sufficient riding on the Burditt Hill route.

**Bus Charter Granted.**—A certificate has been granted by the California Railroad Commission to the Los Angeles Railway to operate motor coach service between Seventh and Los Angeles Streets, in the city of Los Angeles, and the intersection of Whittier Boulevard and Simmons Avenue.

**Petition Shows Railway-Bus Agreement.**—The Jamestown-Dunkirk Transit Company, Inc., has petitioned the New York Public Service Commission for an amendment to its certificate for a bus line in Dunkirk to permit it to change the route over which the line operates. With the petition there is filed a copy of the resolution of the Common Council of Dunkirk, wherein it is shown that an operating agreement has been made between the transit company and the Buffalo & Erie Railway as to the operation of buses and cars in the city. This agreement has been approved by the civic authorities.

**Ruling Reduces Speed of Buses.**—The Board of Public Service of St. Louis, Mo., on April 6 decided to limit the speed of buses operated on Waterman Avenue between Union and Skinker Boulevards at 15 m.p.h. The former limit was 25 m.p.h. The ruling was the result of numerous protests from certain residents who had contended that the double-deck, solid-tired buses operated by the People's Motorbus Company were shaking their houses and causing damage to the property.

**Buses for Week-End Rushes.**—Eight bus runs from Framingham to Boston, Mass., have been eliminated on the Boston & Worcester Street Railway, but three additional railway runs have been placed in operation over the same route. This practically amounts to hourly service between the two points. The buses are being held in reserve for week-end rush runs and other special occasions.

**Buses in Oswego.**—Territory never before reached was opened up at Oswego, N. Y., on April 22 when buses replaced the local railway. The fare was 5 cents. The Empire State Railroad Corporation abandoned its railway operations and auxiliary buses in that city after 40 years of service, carrying out an order of the Public Service Commission which permitted abandonment of the lines on the basis of several years financial losses with a 7-cent fare. Oswego is a city of 22,000.

**Opposes Bus Charter.**—The plan of the Reading Railway for a subsidiary company to operate buses supplementary to steam train service in 24 Pennsylvania counties was opposed on April 22 by the Philadelphia Rapid Transit Company, Philadelphia, Pa. Its protest with the Public Service Commission at Harrisburg was filed after the Reading Transportation Company, the subsidiary company, had applied for a state charter. The traction company's counsel said action was based upon a determination to protect the electric railway bus rights in suburban districts of Philadelphia and in adjacent counties. The plans of the Reading Railway to enter the bus field were upset last year when Governor Pinchot refused to ratify an application for a charter.

**General Transfer System to Be Adopted.**—The International Railway and its subsidiary, the International Bus Corporation, Buffalo, have informed the City Council they will adopt a general transfer system covering all bus and car routes if the municipal authorities will approve the company's application for the proposed Kensington-Bailey bus line. If the proposed franchise is granted, the company will not seek to amend existing bus consents covering restricted transfer privileges, but merely will modify its operating rules to give a universal transfer.

**Would Abandon Bus Line.**—The Key System Transit Company has applied to the California Railroad Commission for permission to abandon operation of its bus service between the intersection of Los Angeles Avenue and Spruce Street and Alta Road and Spruce Street in the city of Berkeley. This bus line has been operated as an experiment by the company and the earnings have been found insufficient to justify its further maintenance. The company asks the commission, in the event that permission to abandon the line is not granted, to charge a fare of 10 cents, with free transfer privilege to the Spruce Street car line, and a 3-cent transfer charge from the Spruce Street car line to the bus line.

# Financial and Corporate

## Sale of United Railways Set for May 25

The properties of the United Railways, St. Louis, Mo., including trackage, franchises, rolling stock, lands and all appurtenances, will be sold by Special Master William L. Igoe, acting for the United States District Court on May 25.

The property will be bought in for the St. Louis Public Service Company, organized by the reorganization committee of the United Railways to take over and operate the system when the receivership is terminated. The property will be bought subject to the lien of the United Railways general bond issue and the consolidated first mortgage of the St. Louis & Suburban Railway. The property has been in receivership since 1919.

On application of the Mercantile Trust Company, Judge Faris on April 19 set May 23 as the date for a hearing on a proposed amendment of the allowance of interest on approximately $3,000,000 of unsecured claims against the United Railways. These claims include $2,396,322 on mill tax judgment with 6 per cent interest to Aug. 5, 1926, due St. Louis. A federal law is said to prohibit the payment of interest on claims during receivership. The Mercantile Trust Company, trustee for the St. Louis Transit bonds, has asked interest be allowed only to April 12, 1919. Counsel for the trust company informed Judge Faris that court orders allowing the claims with interest up to Aug. 5, 1926, have been oversights by the attorneys who drew up the papers. With interest to date the city's mill tax claim aggregates $2,600,000.

## Another Liquidation Dividend by Toronto Railway

Shareholders of Toronto Railway, Toronto, Ont., which has been in process of liquidation for several years, will be notified in the next few days of a disbursement of $1.50 a share on the capital stock of the company. This interim payment will bring the total liquidation dividend so far paid to $115.50 a share.

The work of winding up the company awaits disposition of two suits at law, one by the company and one against it. The first is a claim for about $55,000 from the Niagara Parks Commission, representing a deposit and accrued interest. This deposit was made many years ago on behalf of the Electrical Development Company as a guarantee against claims for physical damage to concessions, etc., in the park while certain work was in process. The time for the filing of claims against this fund expired more than ten years ago. The park commission has declined to pay over the amount until final settlement of claims made by the city of Niagara Falls. It is understood that the railway is willing that the commission settle the claim out of court for what it considers a reasonable amount.

The suit against the company has been brought by an engineer formerly employed under the chief engineer of the railway. The plaintiff in this action claims $25,000 on account of patents developed while he was connected with the railway. He also contends that he did not receive proper notice of dismissal from the employ of the railway company.

These two matters are the only ones which are delaying the final wind-up of the Toronto Railway.

The property of the Toronto Railway was taken over by the city and is now included in the municipal system under the direction of the Toronto Transportation Commission.

## Bids Received for Sale of Detroit Carhouse Property

In response to the request of the Street Railway Commission at Detroit, Mich., for bids for the sale of property for which the department has no practical use adjacent to the Woodward Avenue carhouse, a high bid in the amount of $460,000 was obtained. The property has a frontage of 500 ft. on Woodward Avenue and a depth of 100 ft. The plot is opposite the Highland Park plant of the Ford Motor Company. The sale at this price, which was the highest of several bids received, was not approved by the Council.

Some time ago Del A. Smith asked approval of the expenditure of $280,000 for a west side carhouse site as a step in carrying out plans to split the Grand River-Jefferson Street car line into two lines. A site of 14 acres on Coolidge Avenue was suggested for the carhouse, together with a garage for Grand River line buses. A new carhouse having a capacity of 50 trains was planned.

# Railways Not Earning Fair Return on Investment

### Statistics Covering Operations in 1926 Reveal Increase of Nearly 23,000,000 Car-Miles and 46,000,000 Bus-Miles—Total Service Mileage 2,087,282,159—Return on Investment Slightly Over 4 Per Cent for Total Group—Fares Are Still Too Low

TABLES summarizing the operations of the electric railway industry in 1926 show that the confidence of the electric railways in the future of their business is increasing. They are expanding their service and believe in their future. In particular the results shown in the separate statements for city lines indicate that their intensive efforts to develop their service are having their effect in increased earnings. Their net income was $24,933,183 in 1926, compared with $22,996,661 in 1925, an increase of 8.42 per cent.

Furthermore, many other companies are beginning to share in this improvement, among them smaller companies which heretofore have had very little share in the better conditions which the large companies have been experiencing. This is brought out when the statement for the city companies is broken down into groups according to the size of the companies.

The intermediate group, comprising companies earning from $250,000 to $1,000,000 a year, showed an increase in their gross income, before fixed charges, of 2.21 per cent, which compares favorably with the decrease of 1.63 per cent in this item reported by the large city companies earning more

### Statistics Compiled by American Electric Railway Association

COMBINED OPERATIONS OF 353 COMPANIES

| | 1926 | 1925 | Increase or (D) Decrease | Per Cent Increase or (D) Decrease |
|---|---|---|---|---|
| Railway operating revenue | $824,827,471 | $817,203,432 | $7,624,039 | 0.93 |
| Railway operating expense | 605,871,716 | 598,763,102 | 7,108,614 | 1.19 |
| Net operating revenue | $218,955,755 | $218,440,330 | $515,425 | 0.24 |
| Operating ratio (per cent) | 73.45 | 73.27 | 0.18 | 0.25 |
| Miles of track | 32,096.12 | 32,155.46 | (D) 59.34 | (D)0.18 |
| Revenue passengers | 11,313,080,443 | 11,278,726,640 | 34,353,803 | 0.30 |
| Total passengers | 14,222,469,639 | 14,146,925,787 | 75,543,852 | 0.53 |
| Car-miles (revenue) | 1,963,934,988 | 1,941,047,710 | 22,887,278 | 1.18 |

COMBINED OPERATIONS OF 353 RAILWAY COMPANIES AND 138 CONTROLLED BUS UNDERTAKINGS

| | 1926 | 1925 | Increase or (D) Decrease | Per Cent Increase or (D) Decrease |
|---|---|---|---|---|
| Operating revenue | $857,062,186 | $836,181,160 | $20,881,026 | 2.50 |
| Operating expense | 638,222,627 | 618,635,798 | 19,586,829 | 3.16 |
| Net operating revenue | $218,839,559 | $217,545,362 | $1,294,197 | 0.59 |
| Operating ratio (per cent) | 74.46 | 73.98 | 0.48 | 0.64 |
| Miles of track and bus route | 37,746 | 36,005 | 1,741 | 4.83 |
| Revenue passengers | 11,713,019,298 | 11,535,252,086 | 177,767,212 | 1.54 |
| Total passengers | 14,660,626,195 | 14,423,628,227 | 236,997,968 | 1.64 |
| Car and bus-miles | 2,087,282,159 | 2,017,475,646 | 69,806,513 | 3.46 |

than $1,000,000 per year. Unfortunately for the smaller companies, they were unable to reduce their fixed charges as the larger companies did, but on the contrary had an increase in these charges of 5.51 per cent, which produced a decrease in their net income of 6.08 per cent, compared with an increase in the net income of the larger companies of 8.99 per cent. The failure to reduce their fixed charges is a misfortune that can probably be remedied by a careful study of their capital structure.

Edmund J. Murphy, the chief statistician of the American Electric Railway Association, writing in *Aera* for May, says that the significant thing to be noted is that in so far as purely operating results are concerned, this group was able to effect a greater improvement during the year than the larger companies did.

### Small Companies Losing Ground

The companies in the third city group, earning less than $250,000 a year, have not yet begun to experience the better conditions which have had a favorable effect on the other two groups. These small companies are still losing ground. However, it should be borne in mind in connection with these companies that they constitute only a fraction of the electric railway industry. Out of a total of 8,919,016,768 passengers carried by 231 companies that have been classified into groups only 80,484,333, or about 0.9 per cent, were carried by companies in the Class C group. Their influence on any statement reflecting the operations of the whole industry, therefore, is practically negligible.

In terms of vehicle-miles operated, the industry rendered more service in 1926 than in any previous year of its history. The 353 companies operated 22,887,278 more car-miles last year than they did in 1925. The total revenue car-miles operated in 1926 was 1,963,934,988, compared with 1,941,047,710 in 1925. In addition these companies operated 123,347,171 bus-miles, 46,919,235 more than in 1925. The total service-miles operated, therefore, was 2,087,282,159 in 1926, as against 2,017,475,646 in 1925, an increase of 69,806,513 service-miles.

### Increased Service at Increased Expense

The figures clearly indicate that the electric railways are using the motor bus to extend their transportation service. On the other hand, it is made equally clear that they are not curtailing or reducing their rail service, but on the contrary are giving more rail service, measured in car-miles, than they ever did. The number of miles of single track operated by these 353 companies in 1926 was 32,096, about 60 miles less than they operated in 1925. It represents about 78 per cent of all the electric railway track in the country. The number of miles of bus route operated in 1926 was 5,650, an increase of 1,800 miles. It is practically all additional service.

This additional service, of course, meant increased expenditure on the part of the railways. Operating costs remained approximately the same in both years; the average cost per car-mile was 33.77 cents in 1926 compared with 33.55 cents in 1925, an increase of only 0.7 per cent. The number of cars operated and the number of miles of track, as already indicated, were also approximately the same. The additional miles operated over this track, however, added about $7,000,000 to the expense. In the bus end of the business 1,220 new buses were added during the year. If the investment per bus is put at $7,500, as has been suggested by one authority, the probable amount of new money put into the business in this one year was $9,100,000. The additional mileage operated by the buses cost the companies about $12,500,000 in increased operating expenses. As Mr. Murphy sees it the increased service rendered cost the companies $19,500,000 in increased operating expenses and $9,100,000 in new equipment, or a total of $28,600,000.

On their rail and bus lines in 1926 these 353 companies alone carried 14,660,626,195 passengers, 236,997,968 more than they carried in 1925. Analysis of the complete returns makes it unmistakably clear that the revenue received does not cover the cost of the service. According to Mr. Murphy the return to the companies, taking the group as a whole, is in no way commensurate with the magnitude of the service rendered; is not sufficient, in fact, to enable the industry to finance itself properly. After expatiating on the facts, the author concludes that "with more than half of their capitalization represented by funded obligations, and with the cost of money running up to 7 per cent to them, it is not hard to understand why there is so little left for the stockholder." Out of 231 companies reporting only 45 paid any dividends.

### Inadequacy of Fares Discussed

In extenuation of this idea it is pointed out that the average fare per revenue passenger in 1926 was 7.1 cents. It was the same in 1925. There was no change. In 1912 the average fare per revenue passenger was 5.27 cents. In the intervening years, therefore, the average fare has risen about 35 per cent. At the present time, according to current indexes, the cost of materials used by electric railways is 53 per cent above pre-war levels, while wages are up approximately 110 per cent. Weighing these in the proportion

## Statistics Compiled by American Electric Railway Association

### Part I—Combined Operating Reports of 231 Electric Railways for the Calendar Year 1926 Compared with 1925

TABLE I—COMBINED INCOME STATEMENT

| | 1926 | 1925 | Increase or (D) Decrease Total | Increase or (D) Decrease Per Cent | Cents per Car-Mile 1926 | Cents per Car-Mile 1925 | Cents per Car-Mile Per Cent Increase |
|---|---|---|---|---|---|---|---|
| Railway operating revenue | $554,654,259 | $554,286,419 | $367,840 | 0.07 | 44.83 | 45.01 | (D) 0.40 |
| Railway operating expense | 417,744,496 | 413,196,152 | 4,548,344 | 1.10 | 33.77 | 33.55 | 0.66 |
| Net operating revenue | $136,909,763 | $141,090,267 | (D) $4,180,504 | (D) 2.96 | 11.06 | 11.46 | (D) 3.49 |
| Net revenue: Auxiliary operations | 2,735,257 | 2,861,439 | (D) 126,182 | (D) 4.41 | 0.22 | 0.23 | (D) 4.35 |
| Taxes | 34,693,231 | 34,851,679 | (D) 158,448 | (D) 0.45 | 2.80 | 2.83 | (D) 1.06 |
| Operating income | $104,951,789 | $109,100,027 | (D) $4,148,238 | (D) 3.80 | 8.48 | 8.86 | (D) 4.29 |
| Non-operating income | 10,370,196 | 9,739,426 | 630,770 | 6.47 | 0.84 | 0.79 | 6.33 |
| Gross income | $115,321,985 | $118,839,453 | (D) $3,517,468 | (D) 2.96 | 9.32 | 9.65 | (D) 3.42 |
| Deductions from gross income | 92,734,764 | 95,622,222 | (D) 2,887,458 | (D) 3.02 | 7.50 | 7.76 | (D) 3.35 |
| Net income | $22,587,221 | $23,217,231 | (D) 630,010 | (D) 2.71 | 1.82 | 1.89 | (D) 3.70 |
| Dividends | a$15,632,999 | b$14,550,968 | 1,082,031 | 7.44 | ..... | ..... | ..... |
| Operating ratio (per cent) | 75.32 | 74.55 | 0.77 | 1.03 | ..... | ..... | ..... |
| Ratio: Net income to operating revenue | 4.07 | 4.19 | (D) 0.12 | (D) 2.86 | ..... | ..... | ..... |

*a* Reported by 45 companies. *b* Reported by 46 companies.

TABLE II—OPERATING EXPENSES BY PRIMARY ACCOUNTS

| | 1926 | 1925 | Increase or (D) Decrease Total | Increase or (D) Decrease Per Cent | Cents per Car-Mile 1926 | Cents per Car-Mile 1925 | Cents per Car-Mile Per Cent Increase |
|---|---|---|---|---|---|---|---|
| Way and structures | $60,122,195 | $60,572,914 | (D) $450,719 | (D) 0.74 | 4.86 | 4.92 | (D) 1.22 |
| Equipment | 55,051,245 | 53,372,489 | 1,678,756 | 3.15 | 4.45 | 4.33 | 2.77 |
| Power | 56,495,959 | 56,830,036 | (D) 334,077 | (D) 0.59 | 4.57 | 4.61 | (D) 0.87 |
| Conducting transportation | 182,274,493 | 181,026,591 | 1,247,902 | 6.69 | 14.74 | 14.71 | 0.20 |
| Traffic | 2,235,114 | 1,905,539 | 329,575 | 17.30 | 0.18 | 0.15 | 0.20 |
| General and miscellaneous | 60,309,743 | 58,085,769 | 2,223,974 | 3.83 | 4.87 | 4.72 | 3.18 |
| Transportation for investment—Cr. | —510,696 | —316,832 | —193,864 | 61.19 | 0.04 | 0.03 | 33.33 |
| Total operating expense | a$417,744,496 | b$413,196,152 | $4,548,344 | 1.10 | c33.77 | d33.55 | 0.66 |

*c* Includes $1,766,443 undistributed expense. *d* Includes $1,719,646 undistributed expense.

in which they enter into the cost of operation, 93 per cent is reached as the average increase in cost of materials and labor. In order to produce the same net today as in 1912, therefore, the average fare should have increased 56 per cent instead of the 35 per cent it has increased. In other words, the average fare of this group of companies should have been 8.22 cents instead of 7.10 cents.

The author says:

### Financial Structures Improved

Undoubtedly this failure to raise fares in proportion to the increase in the cost of operation has been an important cause, if not the most important cause, of the present condition of the electric railways. On the other hand, it cannot be denied that many electric railway managements have neglected to take advantage of improved methods and equipment which might help them to better their condition. They have been especially derelict in the field of public relations, which is undoubtedly the master key to the solution of their problems. This is proved by what has been accomplished by the more progressive managements among both the larger and smaller properties.

Operating under conditions identical with those of the rest of the industry they have by their skill and their readiness to adopt new ideas succeeded in holding or increasing their traffic and enlisting the co-operation of their patrons so that as a result they have been able to secure more equitable consideration from their public authorities. Fortunately more and more managements are learning from these examples that at least part of their problem is solvable by their own efforts and they can be counted upon to put forth greater efforts along better directed lines in the future than they have in the past.

As the author sees it, the companies are making serious efforts to recast their financial structures along more conservative lines as was recommended in the report of the Advisory Committee on Electric Railway Finance. As a result of this reduction in fixed charges the net income of these companies was only slightly less than in 1925, $630,010, or 2.71 per cent less. The final net income in 1926 was $22,587,221, as compared with $23,217,231 in 1925. As has already been pointed out, if the city companies in the intermediate group could have effected a reduction in their fixed charges similar to that of the "A" companies this net income would have been increased materially.

Practically all of this net income was earned by the city companies alone. The straight out interurban lines as a group operated at a deficit of $3,692,565, while the combination city and interurban companies earned a net income of only $1,346,603, which was a decrease of 62.66 per cent from the net income of $3,605,885 earned in 1925. Presumably this net was produced by the city operations in this group as distinct from the interurban divisions. It does not entirely offset the deficit in the straight interurban group. This was done by the city companies, which earned a net income of $24,933,183, an increase of $1,936,522, or 8.42 per cent, over the net income of 1925.

### Net Income Earned by Class A Companies

Practically all of the net income of the city companies was earned by the Class A companies, the large companies having annual operating revenues of $1,000,000 or more. This group produced $24,212,808 of the net income of the whole city group, an increase of $1,997,080, or 8.99 per cent. The Class B group of city companies, having annual revenues between $250,000 and $1,000,000, earned a net income of $768,071, a decrease of 6.08 per cent from 1925, while the Class C group, with annual revenues of less than $250,000 per

TABLE III—OPERATING STATISTICS—231 COMPANIES

| | 1926 | 1925 | Increase or (D) Decrease | Per Cent Increase or (D) Decrease |
|---|---|---|---|---|
| Passenger car-miles | 1,198,394,439 | 1,194,479,026 | 3,915,413 | 0.33 |
| Total revenue car-miles | 1,237,170,988 | 1,231,595,630 | 5,575,358 | 0.45 |
| Revenue passengers[1] | 7,091,099,427 | 7,159,077,205 | (D) 67,977,778 | (D) 0.95 |
| Transfer passengers[2] | 1,763,652,908 | 1,745,789,612 | 17,863,296 | 1.02 |
| Total passengers[1] | 8,919,016,768 | 8,971,547,179 | (D) 52,530,411 | (D) 0.59 |
| Passenger revenue | $517,836,495 | $518,970,998 | (D) $1,134,503 | (D) 0.22 |
| Revenue car-hours[3] | 113,847,101 | 113,958,283 | (D) 111,182 | (D) 0.10 |
| Passenger car-hours[3] | 111,866,605 | 111,978,615 | (D) 112,010 | (D) 0.10 |
| Miles of single track | 24,082.70 | 24,045.60 | 37.10 | 0.15 |
| Passenger cars operated *a*[4] | 28,362 | 28,401 | (D) 39 | (D) 0.14 |

*a* Average maximum number of passenger cars in service daily.
[1] Reported by 276 companies. [2] Reported by 156 companies.
[3] Reported by 199 companies. [4] Reported by 191 companies.

TABLE IV—SIGNIFICANT RATIOS DERIVED FROM THE FOREGOING TABLES—231 COMPANIES

| | 1926 | 1925 | Per Cent Increase or (D) Decrease |
|---|---|---|---|
| Railway operating revenue | $554,654,259 | $554,286,419 | 0.07 |
| Per mile of single track | $23,031 | $23,051 | (D) 0.09 |
| Gross income | $15,321,985 | $118,839,453 | (D) 2.96 |
| Per mile of single track | $4,789 | $4,942 | (D) 3.10 |
| Passenger revenue | $517,836,495 | $518,970,998 | (D) 0.22 |
| Per revenue passenger | [1]7.1c | [1]7.1c | ..... |
| Per total passenger | [1]5.7c | [1]5.7c | ..... |
| Per mile of single track | $21,502 | $21,583 | 0.38 |
| Per passenger car-mile | 43.2c | 43.4c | (D) 0.46 |
| Per car operated | [2]$16,192 | [2]$16,205 | (D) 0.08 |
| Per passenger car-hour | [4]$4.09 | [4]$4.10 | (D) 0.24 |
| Revenue passengers | [1]7,091,099,427 | [1]7,159,077,205 | (D) 0.95 |
| Per mile of single track | [1]304,599 | [1]308,115 | (D)1.14 |
| Per passenger car-mile | [1]6.0 | [1]6.1 | (D) 1.64 |
| Per car operated | [5]224,011 | [5]225,796 | (D) 0.79 |
| Per passenger car-hour | [6]58 | [6]59 | (D) 1.69 |
| Total passengers | [1]8,919,016,768 | [1]8,971,547,179 | (D) 0.59 |
| Per mile of single track | [1]383,118 | [1]386,120 | (D) 0.77 |
| Per passenger car-mile | [1]7.6 | [1]7.7 | (D) 1.30 |
| Ratio: Transfer passengers to revenue passengers (per cent) | 24.9% | 24.4% | 2.05 |
| Revenue car miles | 1,237,170,988 | 1,231,595,630 | 0.45 |
| Per mile of single track | 51,372 | 51,219 | 0.30 |
| Per car operated | [3]38,599 | [3]38,385 | 0.56 |
| Per car-hour | [3]9.27 | [3]9.24 | 0.32 |
| Car-hours | [2]113,847,101 | [2]113,958,283 | (D) 0.10 |
| Per car operated | [7]4,068 | [7]4,046 | 0.54 |

[1] 226 companies. [2] 199 companies. [3] 191 companies. [4] 198 companies.
[5] 184 companies. [6] 195 companies. [7] 169 companies.

## Part II—City Lines—Combined Reports of 98 Companies Operating City Lines Exclusively

TABLE V—COMBINED INCOME STATEMENT

| | 1926 | 1925 | Increase or (D) Decrease | Per Cent Increase or (D) Decrease |
|---|---|---|---|---|
| Railway operating revenue | $396,636,549 | $394,400,201 | $2,236,348 | 0.57 |
| Railway operating expense | 292,176,016 | 288,334,927 | 3,841,089 | 1.33 |
| Net operating revenue | $104,460,533 | $106,065,274 | (D) $1,604,741 | (D) 1.51 |
| Net revenue: Auxiliary operations | 946,992 | 1,038,075 | (D) 91,083 | (D) 8.77 |
| Taxes | 24,656,645 | 24,635,667 | 20,978 | 0.09 |
| Operating income | $80,750,880 | $82,467,682 | (D) $1,716,802 | (D) 2.08 |
| Non-operating income | 5,847,424 | 5,456,818 | 390,606 | 7.16 |
| Gross income | $86,598,304 | $87,924,500 | (D) $1,326,196 | (D) 1.51 |
| Deductions from gross income | 61,665,121 | 64,927,839 | (D) 3,262,718 | (D) 5.03 |
| Net income | $24,933,183 | $22,996,661 | $1,936,522 | 8.42 |
| Dividends | *a*$14,114,326 | *a*$12,248,138 | $1,866,188 | 15.24 |
| Operating ratio, per cent | 73.66 | 73.11 | 0.55 | 0.75 |
| Ratio: Net income to operating revenue | 6.29 | 5.83 | 0.46 | 7.89 |

*a* Reported by 29 companies.

TABLE VI—OPERATING EXPENSES BY PRIMARY ACCOUNTS

| | 1926 | 1925 | Increase or (D) Decrease | Per Cent Increase or (D) Decrease |
|---|---|---|---|---|
| Way and structures | $38,974,130 | $40,174,856 | (D) $1,200,726 | (D) 2.99 |
| Equipment | 38,330,429 | 36,959,018 | 1,371,411 | 3.71 |
| Power | 37,970,036 | 38,095,788 | (D) 125,752 | (D) 0.33 |
| Conducting transportation | 135,453,291 | 133,530,457 | 1,922,834 | 1.44 |
| Traffic | 1,042,390 | 716,606 | 325,784 | 45.46 |
| General and miscellaneous | 38,741,674 | 37,268,505 | 1,473,169 | 3.95 |
| Transportation for investment—Cr. | —83,802 | —114,209 | (D) —30,407 | (D) 26.62 |
| Total operating expense | *a*$292,176,016 | *b*$288,334,927 | $3,841,089 | 1.33 |

*a* Includes $1,747,868 undistributed expense.
*b* Includes $1,703,906 undistributed expense.

TABLE VII—OPERATING STATISTICS

| | 1926 | 1925 | Increase or (D) Decrease | Per Cent Increase or (D) Decrease |
|---|---|---|---|---|
| Passenger car-miles | 866,532,242 | 856,395,412 | 10,136,830 | 1.18 |
| Total revenue car-miles | 868,828,647 | 859,048,561 | 9,780,086 | 1.14 |
| Revenue passengers[1] | 5,540,229,291 | 5,554,933,217 | (D) 14,703,926 | (D)0.26 |
| Transfer passengers[2] | 1,574,719,591 | 1,554,930,129 | 19,789,462 | 1.27 |
| Total passengers[1] | 7,145,851,769 | 7,142,030,764 | 3,821,005 | 0.05 |
| Passenger revenue | $385,787,072 | $383,948,891 | $1,838,181 | 0.48 |
| Revenue car-hours[3] | 85,018,306 | 84,572,717 | 445,589 | 0.53 |
| Passenger car-hours[3] | 84,800,918 | 84,346,146 | 454,772 | 0.54 |
| Miles of single track | 11,155.06 | 11,131.88 | 23.18 | 0.21 |
| Passenger cars operated[4] *a* | 21,369 | 21,325 | 44 | 0.21 |

*a* Average maximum number of passenger cars in service daily. [1] Reported by 95 companies. [2] Reported by 76 companies. [3] Reported by 86 companies.
[4] Reported by 88 companies.

year, had a deficit of $47,696, which was $10,805 greater than in 1925. All of the groups of the interurban companies operated at a deficit, while among the combination companies only the Class A group earned any net income. It amounted to $2,388,006 and represented a decrease of 50.48 per cent from 1925.

It is quite apparent from the foregoing that only the larger city companies made any money in 1926—those in the class earning more than $250,000 per year. This is the class that has been freest from competition and has been least affected by the use of the private automobile. It is also the class whose problems have received the most careful consideration, probably for the very reason that no satisfactory competitive service was available. In consequence the companies in this group, not all of them, perhaps, but some of them, have succeeded in securing rates that in some measure meet the cost of service.

The rest of the companies in the other groups are struggling, with varying degrees of success, to give a service the cost of which is not covered by their revenues. Either these companies must receive adequate revenues or the service they give must be curtailed. The companies are making a commendable effort to improve and extend their service wherever there seems to be the faintest chance of justifying it; these efforts must receive the cooperation of the traveling public expressed in an adequate system of rates.

This is particularly true in the smaller communities and outlying districts. The tables show that the smaller companies are in a precarious situation, are not in fact earning their fixed charges. Their condition is of course due to the omnipresent private automobile, whose inroads into the passenger traffic of the local street railways during the past ten years have cut down their sources of revenue. The problem presented is a serious one both to the companies themselves and the public they serve. In the case of the former there is a large investment at stake, while in the case of the public a decision has to be made as to whether they want and are willing to pay for a common carrier service, to which they have become accustomed but which they no longer patronize as intensively as they once did. It is a question of adequate rates or no service. When a certain fraction of the patrons of a railway cease to use it, the remaining fraction must naturally pay a higher per capita rate if they

## Part III—Interurban Lines—Combined Reports of 50 Companies Operating Interurban Lines Exclusively

TABLE VIII—INCOME STATEMENT OF 50 ELECTRIC RAILWAYS

| | 1926 | 1925 | Increase or (D) Decrease | Per Cent Increase or (D) Decrease |
|---|---|---|---|---|
| Railway operating revenue | $20,861,035 | $20,985,530 | (D) $124,495 | (D) 0.59 |
| Railway operating expense | 17,590,451 | 17,499,048 | 91,403 | 0.52 |
| Net operating revenue | $3,270,584 | $3,486,482 | (D) $215,898 | (D) 6.19 |
| Net revenue: Auxiliary operations | 180,441 | 174,934 | 5,507 | 3.15 |
| Taxes | 1,236,234 | 1,293,882 | (D) 57,648 | (D) 4.46 |
| Operating income | $2,214,791 | $2,367,534 | (D) $152,743 | (D) 6.45 |
| Non-operating income | 218,781 | 237,561 | (D) 18,780 | (D) 7.91 |
| Gross income | $2,433,572 | $2,605,095 | (D) $171,523 | (D) 6.58 |
| Deductions from gross income | 6,126,137 | 5,990,410 | 135,727 | 2.27 |
| Net income | *$3,692,565 | *$3,385,315 | (D) $307,250 | ..... |
| Dividends | a$178,323 | a$170,766 | $7,557 | 4.43 |
| Operating ratio, (per cent) | 84.32 | 83.39 | 0.93 | 1.11 |
| Ratio: Net income to operating revenue | ..... | ..... | ..... | ..... |

* Deficit. *a* Reported by three companies.

TABLE IX—OPERATING EXPENSES BY PRIMARY ACCOUNTS

| | 1926 | 1925 | Increase or (D) Decrease | Per Cent Increase or (D) Decrease |
|---|---|---|---|---|
| Way and structures | $3,101,579 | $3,215,090 | (D) $113,511 | (D) 3.53 |
| Equipment | 2,140,856 | 2,009,202 | 131,654 | 6.55 |
| Power | 3,047,981 | 3,076,690 | (D) 28,709 | (D) 0.93 |
| Conducting transportation | 5,617,926 | 5,617,182 | 744 | 0.01 |
| Traffic | 356,658 | 360,250 | (D) 3,592 | (D) 1.00 |
| General and miscellaneous | 3,314,371 | 3,215,915 | 98,456 | 3.06 |
| Transportation for investment—Cr. | —7,495 | —11,021 | (D) —3,526 | (D) 31.99 |
| Total operating expense | a$17,590,451 | b$17,499,048 | $91,403 | 0.52 |

*a* Includes $18,575 undistributed expense.
*b* Includes $15,740 undistributed expense.

TABLE X—OPERATING STATISTICS

| | 1926 | 1925 | Increase or (D) Decrease | Per Cent Increase or (D) Decrease |
|---|---|---|---|---|
| Passenger car-miles | 35,005,554 | 35,543,691 | (D) 538,137 | (D)1.51 |
| Total revenue car-miles | 46,299,079 | 45,753,368 | 545,711 | 1.19 |
| Revenue passengers | 53,342,580 | 55,097,566 | (D) 1,754,986 | (D)3.19 |
| Transfer passengers[1] | 1,284,850 | 1,293,212 | (D) 8,362 | (D)0.65 |
| Total passengers | 55,929,159 | 57,710,107 | (D) 1,780,948 | (D)3.09 |
| Passenger revenue | $12,958,716 | $13,477,663 | (D) $518,947 | (D)3.85 |
| Revenue car-hours[2] | 1,990,427 | 1,933,574 | 56,853 | 2.94 |
| Passenger car-hours[2] | 1,261,551 | 1,247,595 | 13,956 | 1.12 |
| Miles of single track | 3,212.48 | 3,211.53 | 0.95 | 0.03 |
| Passenger cars operated[3]a | 616 | 595 | 21 | 3.53 |

*a* Average maximum number of passenger cars in service daily. [1] Reported by 16 companies. [2] Reported by 37 companies. [3] Reported by 40 companies

## Part IV—City and Interurban Lines—Combined Reports of 83 Companies Operating Combined City and Interurban Lines

TABLE XI—INCOME STATEMENT

| | 1926 | 1925 | Increase or (D) Decrease | Per Cent Increase or (D) Decrease |
|---|---|---|---|---|
| Railway operating revenue | $137,156,675 | $138,900,688 | (D) $1,744,013 | (D) 1.26 |
| Railway operating expense | 107,978,029 | 107,362,177 | 615,852 | 0.57 |
| Net operating revenue | $29,178,646 | $31,538,511 | (D) $2,359,865 | (D) 7.48 |
| Net revenue: Auxiliary operations | 1,607,824 | 1,648,430 | (D) 40,606 | (D) 2.46 |
| Taxes | 8,800,352 | 8,922,130 | (D) 121,778 | (D) 1.36 |
| Operating income | $21,986,118 | $24,264,811 | (D) $2,278,693 | (D) 9.39 |
| Non-operating income | 4,303,991 | 4,045,047 | 258,944 | 6.40 |
| Gross income | $26,290,109 | $28,309,858 | (D) $2,019,749 | (D) 7.13 |
| Deductions from gross income | 24,943,506 | 24,703,973 | 239,533 | 0.97 |
| Net income | $1,346,603 | $3,605,885 | (D) $2,259,282 | (D) 62.66 |
| Dividends | a$1,340,350 | b$2,132,064 | (D) $791,714 | (D) 37.13 |
| Operating ratio, per cent | 78.73 | 77.29 | 0.44 | 1.86 |
| Ratio: Net income to operating revenue | 0.98 | 2.60 | (D) 1.62 | (D) 62.31 |

*a* Reported by 13 companies. *b* Reported by 14 companies.

TABLE XII—OPERATING EXPENSES BY PRIMARY ACCOUNTS

| | 1926 | 1925 | Increase or (D) Decrease | Per Cent Increase or (D) Decrease |
|---|---|---|---|---|
| Way and structures | $18,046,486 | $17,182,968 | $863,518 | 5.03 |
| Equipment | 14,579,960 | 14,404,269 | 175,691 | 1.22 |
| Power | 15,477,942 | 15,657,558 | (D) 179,616 | (D) 1.15 |
| Conducting transportation | 41,203,276 | 41,878,952 | (D) 675,676 | (D) 1.61 |
| Traffic | 836,066 | 828,683 | 7,383 | 0.89 |
| General and miscellaneous | 18,253,698 | 17,601,349 | 652,349 | 3.71 |
| Transportation for investment—Cr. | —419,399 | —191,602 | —227,797 | 118.89 |
| Total operating expense | $107,978,029 | $107,362,177 | $615,852 | 0.57 |

TABLE XIII—OPERATING STATISTICS

| | 1926 | 1925 | Increase or (D) Decrease | Per Cent Increase or (D) Decrease |
|---|---|---|---|---|
| Passenger car-miles | 296,856,643 | 302,539,923 | (D) 5,683,280 | (D)1.88 |
| Total revenue car-miles | 322,043,262 | 326,793,701 | (D) 4,750,439 | (D)1.45 |
| Revenue passengers[1] | 1,497,527,556 | 1,549,046,422 | (D) 51,518,866 | (D)3.33 |
| Transfer passengers[2] | 187,648,467 | 189,566,271 | (D) 1,917,804 | (D)1.01 |
| Total passengers[1] | 1,717,235,840 | 1,771,806,308 | (D) 54,570,468 | (D)3.08 |
| Passenger revenue | $119,090,707 | $121,544,444 | (D) $2,453,737 | (D)2.02 |
| Revenue car-hours[3] | 26,838,368 | 27,451,992 | (D) 613,624 | (D)2.24 |
| Passenger car-hours[3] | 25,804,136 | 26,384,874 | (D) 580,738 | (D)2.20 |
| Miles of single track | 9,715.16 | 9,702.19 | 12.97 | 0.13 |
| Passenger cars operated[4]a | 6,377 | 6,481 | (D) 104 | (D)1.60 |

*a* Average maximum number of passenger cars in service daily. [1] Reported by 81 companies. [2] Reported by 63 companies. [3] Reported by 76 companies. [4] Reported by 63 companies.

## Part V—Combined Statements of All Three Types of Companies on a Car-Mile Basis

TABLE XIV—INCOME STATEMENT OF 98 CITY COMPANIES, 50 INTERURBAN COMPANIES AND 83 COMPANIES OPERATING COMBINED CITY AND INTERURBAN LINES

| | City Lines | | | Interurban Lines | | | City and Interurban Lines | | |
|---|---|---|---|---|---|---|---|---|---|
| | Cents per Car-Mile 1926 | Cents per Car-Mile 1925 | Per Cent Increase or (D) Decrease | Cents per Car-Mile 1926 | Cents per Car-Mile 1925 | Per Cent Increase or (D) Decrease | Cents per Car-Mile 1926 | Cents per Car-Mile 1925 | Per Cent Increase or (D) Decrease |
| Railway operating revenue.. | 45.65 | 45.91 | (D)0.56 | 45.06 | 45.87 | (D)1.77 | 42.59 | 42.50 | 0.21 |
| Railway operating expense... | 33.63 | 33.56 | 0.21 | 37.99 | 38.25 | (D)0.68 | 33.53 | 32.85 | 2.07 |
| Net operating revenue.... | 12.02 | 12.35 | (D)2.67 | 7.07 | 7.62 | (D)6.22 | 9.06 | 9.65 | (D)6.11 |
| Net revenue: Auxiliary operations..... | 0.11 | 0.12 | (D)8.33 | 0.39 | 0.38 | 2.63 | 0.50 | 0.50 | ..... |
| Taxes..... | 2.84 | 2.87 | (D)1.03 | 2.67 | 2.83 | (D) 5.65 | 2.73 | 2.73 | ..... |
| Operating income..... | 9.29 | 9.60 | (D)3.23 | 4.79 | 5.17 | (D) 7.35 | 6.83 | 7.42 | (D)7.95 |
| Non-operating income..... | 0.68 | 0.64 | 6.25 | 0.47 | 0.52 | (D)10.62 | 1.34 | 1.24 | 8.06 |
| Gross income..... | 9.97 | 10.24 | (D)2.64 | 5.26 | 5.69 | (D) 7.56 | 8.17 | 8.66 | (D)5.66 |
| Deductions from gross income | 7.10 | 7.56 | (D)6.08 | 13.23 | 13.09 | 1.07 | 7.75 | 7.56 | 2.51 |
| Net income..... | 2.87 | 2.68 | 7.09 | *7.97 | *7.40 | ..... | 0.42 | 1.10 | (D)61.82 |

* Deficit.

TABLE XV—OPERATING EXPENSES OF 98 CITY COMPANIES, 50 INTERURBAN COMPANIES AND 83 COMPANIES OPERATING COMBINED CITY AND INTERURBAN LINES

| | City Lines | | | Interurban Lines | | | City and Interurban Lines | | |
|---|---|---|---|---|---|---|---|---|---|
| | Cents per Car-Mile 1926 | Cents per Car-Mile 1925 | Per Cent Increase or (D) Decrease | Cents per Car-Mile 1926 | Cents per Car-Mile 1925 | Per Cent Increase or (D) Decrease | Cents per Car-Mile 1926 | Cents per Car-Mile 1925 | Per Cent Increase or (D) Decrease |
| Way and structures..... | 4.49 | 4.68 | (D)4.06 | 6.70 | 7.03 | (D)4.69 | 5.60 | 5.26 | 6.46 |
| Equipment..... | 4.41 | 4.30 | 2.56 | 4.62 | 4.39 | 5.24 | 4.53 | 4.41 | 2.72 |
| Power..... | 4.37 | 4.43 | (D)1.35 | 6.58 | 6.72 | (D)2.08 | 4.81 | 4.79 | 0.42 |
| Conducting transportation.... | 15.59 | 15.54 | 0.32 | 12.13 | 12.28 | (D)1.22 | 12.79 | 12.82 | (D)0.23 |
| Traffic..... | 0.12 | 0.08 | 50.00 | 0.77 | 0.79 | (D)3.92 | 0.26 | 0.25 | 4.00 |
| General and miscellaneous... | 4.46 | 4.34 | 2.76 | 7.17 | 7.03 | 1.99 | 5.67 | 5.38 | 5.39 |
| Transportation for invest.—Cr..... | 0.01 | 0.01 | ..... | 0.02 | 0.02 | ..... | 0.13 | 0.06 | 116.67 |
| *Total operating expenses. | 33.63 | 33.56 | 0.21 | 37.99 | 38.25 | (D)0.68 | 33.53 | 32.85 | 2.07 |
| * Undistributed expenses included in total..... | 0.20 | 0.20 | ..... | 0.04 | 0.03 | ..... | ..... | ..... | ..... |

want the service continued, especially if, as is actually the case, the cost of operation has meanwhile increased. If the rate necessary to maintain service is more than the service is worth to the people of the community, service must be abandoned.

This is true whether the line be a bus line or a railway. In communities where the riding habit is low and the density of traffic consequently below a certain minimum, the bus undoubtedly is more economical, but the point to be made here is that neither vehicle can hope to operate successfully at the fare which formerly sufficed for the railway. When only a fraction of the former patrons now use the service, rates must be recast on a new basis. And in view of the fact that in many of these small communities there is some doubt as to whether any rate which patrons are willing to pay would yield a return on the investment, it would seem logical in these cases to leave the operator free to charge whatever rate he wants to so that he may experiment to determine if there is any rate that will yield a fair return. It is no longer a question of confiscation or extortion, but of whether or not there is an economic demand for the service.

The smaller companies as a group are not earning their fixed charges—are operating at a deficit which was larger in 1926 than in 1925. Their traffic continues to fall off rapidly. The paramount question with respect to them is whether or not they will survive. Unquestionably it would seem to be the part of wisdom for any of these small communities that want to keep their street car service—and the evidence is that all of them do—to relieve them of all burdensome restrictions and taxes and give them a free hand to see if they can work out their own salvation.

In conclusion Mr. Murphy says:

The problems of these small companies are, as has already been said, acute and serious, but at this point, perhaps, it should be said again that they constitute a very small fraction of the electric railway industry and what has been said about them in no way vitiates the statements that were previously made about the indusry as a whole.

The other companies, the great bulk of the industry, while by no means prosperous, are nevertheless confidently going forward with plans for the future. For them the year 1926 was marked by unusually steady,

## Part VI—Derived Ratios

TABLE XVI—SIGNIFICANT RATIOS DERIVED FROM THE FOREGOING TABLES

| | 98 City Companies | | | 50 Interurban Companies | | | 83 Companies Operating Both City and Interurban Lines | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1926 | 1925 | Per Cent Increase or (D) Decrease | 1926 | 1925 | Per Cent Increase or (D) Decrease | 1926 | 1925 | Per Cent Increase or (D) Decrease |
| Railway operating revenue..... | $396,636,549 | $394,400,201 | 0.57 | $20,861,035 | $20,985,530 | (D) 0.59 | $137,156,675 | $138,900,688 | (D) 1.28 |
| Per mile of single track..... | $35,557 | $35,430 | 0.36 | 6,494 | $6,534 | (D) 0.61 | $14,118 | $14,316 | (D) 1.36 |
| Gross income..... | $86,598,304 | $87,924,500 | (D) 1.51 | $2,433,572 | $2,605,095 | (D) 6.58 | $26,290,109 | $28,309,858 | (D) 7.13 |
| Per mile of single track..... | $7,763 | $7,898 | (D) 1.71 | $758 | $811 | (D) 6.54 | $2,706 | $2,918 | (D) 7.27 |
| Passenger revenue..... | $385,787,072 | $383,948,891 | 0.48 | $12,958,716 | $13,477,663 | (D) 3.85 | $119,090,707 | $121,544,444 | (D) 2.02 |
| Per revenue passenger..... | [1]6.8c. | [1]6.8c. | ..... | 24.3c. | 24.5c. | (D) 0.70 | [2]7.8c. | [2]2.7c. | 1.30 |
| Per total passenger..... | 15.3c. | 15.3c. | ..... | 23.2c | 23.4c. | (D) 0.86 | [2]6.8c. | [2]6.7c. | 1.49 |
| Per mile of single track..... | $34,584 | $34,491 | 0.27 | $4,034 | $4,197 | (D) 3.88 | $12,258 | $12,528 | (D) 2.16 |
| Per passenger car-mile..... | 44.5c. | 44.8c. | (D) 0.67 | 37.0c. | 37.9c. | (D) 2.35 | 40.1c. | 40.2c. | (D) 0.25 |
| Per car operated..... | [3]$16,036 | [3]$15,981 | 0.34 | [5]$18,112 | [5]$19,306 | (D) 6.18 | [7]$16,527 | [7]$16,655 | (D) 0.77 |
| Per passenger car-hour..... | [4]$4.09 | [4]$4.11 | (D) 0.49 | [6]$6.44 | [6]$6.52 | (D) 1.23 | [8]$3.98 | [8]$3.98 | ..... |
| Revenue passengers..... | [1]5,540,229,291 | [1]5,554,933,217 | (D) 0.26 | 53,342,580 | 55,097,566 | (D) 3.19 | [2]1,497,527,556 | [2]1,549,046,422 | (D) 3.33 |
| Per mile of single track..... | [1]529,448 | [1]532,397 | (D) 0.55 | 16,605 | 17,156 | (D) 3.21 | [2]155,937 | [2]161,531 | (D) 3.46 |
| Per passenger car-mile..... | [1]6.5 | [1]6.6 | (D) 1.52 | 1.55 | 1.6 | (D) 6.25 | [2]5.1 | [2]5.2 | (D) 1.98 |
| Per car operated..... | [9]231,566 | [9]232,402 | (D) 0.24 | [5]77,745 | [5]82,661 | (D) 5.95 | [11]213,349 | [11]217,662 | (D) 1.99 |
| Per passenger car-hour..... | [10]60 | [10]61 | (D) 1.64 | [6]33 | [6]34 | (D) 2.94 | [12]53 | [12]54 | (D) 1.84 |
| Total passengers..... | [1]7,145,851,769 | [1]7,142,030,764 | 0.05 | 55,929,159 | 57,710,107 | (D) 3.09 | [2]1,717,235,840 | [2]1,771.806,308 | (D) 3.08 |
| Per mile of single track..... | [1]682,888 | [1]684,508 | (D) 0.24 | 17,410 | 17,969 | (D) 3.11 | [2]178,815 | [2]184,760 | (D) 3.22 |
| Per passenger car-mile..... | [1]8.5 | [1]8.5 | (D) 1.18 | 1.6 | 1.6 | ..... | [2]5.9 | [2]5.9 | ..... |
| Ratio Transfer passengers to revenue passengers (per cent)..... | 28.4% | 28.0% | 1.43 | 2.4% | 2.3% | 4.35 | 12.5% | 12.2% | 2.46 |
| Revenue car miles..... | 868,828,647 | 859,048,561 | 1.14 | 46,299,079 | 45,753,368 | 1.19 | 322,043,262 | 326,793,701 | (D) 1.45 |
| Per mile of single track..... | 77,887 | 77,170 | 0.93 | 14,412 | 14,247 | 1.16 | 33,149 | 33,682 | (D) 1.58 |
| Per car operated..... | [3]36,320 | [3]35,908 | 1.15 | [5]61,621 | [5]62,202 | (D) 0.93 | [7]44,013 | [7]44,352 | (D) 0.76 |
| Per car-mile..... | [4]9.0 | [4]8.9 | 1.12 | [6]13.1 | [6]13.1 | ..... | [13]9.9 | [13]9.9 | ..... |
| Car-hours..... | [4]85,018,306 | [4]84,572,717 | 0.53 | [6]1,990,427 | [6]1,933,574 | 2.94 | [13]26,838,368 | [13]27,451,992 | (D) 2.24 |
| Per car operated..... | [14]3,990 | [14]3,969 | 0.53 | [16]4,309 | [16]4,321 | (D) 0.28 | [16]4,326 | [16]4,289 | 0.86 |

[1] 95 companies
[2] 81 companies
[3] 88 companies
[4] 86 companies
[5] 40 companies
[6] 37 companies
[7] 63 companies
[8] 75 companies
[9] 85 companies
[10] 84 companies
[11] 59 companies
[12] 74 companies
[13] 76 companies
[14] 77 companies
[15] 32 companies
[16] 60 companies

## Part VII—Analysis of Income Statement

TABLE XVII—ANALYSIS OF OPERATING STATEMENT—PER CENT INCREASE OR (D) DECREASE

| | City Companies | | | Interurban Companies | | | Combined Properties | | |
|---|---|---|---|---|---|---|---|---|---|
| | 42 Cos. with Revenues of More than $1,000,000 a Year Each | 31 City Cos. with Revenues $250,000 to $1,000,000 a Year Each | 25 Cos. with Revenues of Less than $250,000 a Year Each | 4 Cos. with Revenues of More than $1,000,000 a Year Each | 17 Cos. with Revenues of $250,000 to $1,000,000 a Year Each | 29 Cos. with Revenues of Less than $250,000 a Year Each | 31 Cos. with Revenues of More than $1,000,000 a Year Each | 27 Cos. with Revenues of $250,000 to $1,000,000 a Year Each | 25 Cos. with Revenues of Less than $250,000 a Year Each |
| Railway operating revenue | 0.59 | 0.30 | (D) 1.67 | 1.04 | (D) 1.04 | (D) 2.28 | (D) 1.10 | (D) 1.86 | (D) 3.85 |
| Railway operating expense | 1.44 | (D) 0.15 | (D) 2.06 | (D) 0.32 | 1.66 | (D) 1.21 | 0.95 | (D) 1.34 | (D) 2.12 |
| Net operating revenue | (D) 1.64 | 2.26 | 0.26 | 6.30 | (D) 14.75 | (D) 12.10 | (D) 7.75 | (D) 3.96 | (D) 31.66 |
| Net revenue: Auxiliary operations | 1.84 | (D) 19.03 | (D) 37.54 | 9.48 | (D) 1.01 | (D) 9.69 | (D) 3.13 | 25.24 | ..... |
| Taxes | 0.50 | (D) 9.45 | (D) 3.74 | 3.99 | (D) 7.73 | (D) 10.81 | (D) 0.66 | (D) 6.16 | (D) 4.70 |
| Operating income | (D) 2.25 | 2.34 | 1.60 | 7.51 | (D) 18.03 | (D) 13.38 | (D) 9.92 | (D) 2.58 | ..... |
| Non-operating income | 7.58 | (D) 0.09 | (D) 26.75 | 18.00 | (D) 16.24 | (D) 61.64 | (D) 0.95 | 14.07 | 63.85 |
| Gross income | (D) 1.63 | 2.21 | (D) 1.55 | 8.67 | (D) 17.99 | (D) 25.17 | (D) 8.81 | 1.09 | 42.46 |
| Deductions from gross income | (D) 5.41 | 5.51 | 1.38 | 3.94 | 1.16 | (D) 0.63 | 1.19 | (D) 0.33 | 2.21 |
| Net income | 8.99 | (D) 6.08 | ..... | ..... | ..... | ..... | (D) 50.48 | ..... | ..... |
| Dividends | 16.29 | (D) 14.47 | (D) 68.31 | ..... | 4.43 | ..... | (D) 53.47 | (D) 0.10 | 17.30 |
| Operating ratio (per cent) | 0.84 | (D) 0.44 | (D) 0.40 | (D) 1.35 | 2.73 | 1.10 | 2.08 | 0.54 | 1.80 |
| Ratio: Net income to operating revenue | 8.43 | (D) 6.34 | ..... | ..... | ..... | ..... | (D) 50.00 | ..... | ..... |

TABLE XVIII—OPERATING EXPENSES BY PRIMARY ACCOUNTS—PER CENT INCREASE OR (D) DECREASE

| | City Companies | | | Interurban Companies | | | Combined Properties | | |
|---|---|---|---|---|---|---|---|---|---|
| Way and structures | (D) 3.44 | 7.50 | (D) 1.58 | (D) 11.42 | 1.30 | (D) 4.47 | 5.88 | 0.98 | (D) 0.19 |
| Equipment | 3.88 | 1.54 | (D) 2.19 | 14.00 | 3.47 | 1.67 | 1.09 | 2.31 | 0.20 |
| Power | 0.17 | (D) 6.94 | (D) 2.76 | (D) 0.99 | (D) 0.08 | (D) 3.34 | (D) 0.83 | (D) 2.56 | (D) 3.00 |
| Conducting transportation | 1.56 | (D) 0.76 | (D) 1.46 | 0.60 | (D) 0.52 | 0.43 | (D) 1.41 | (D) 2.34 | (D) 5.47 |
| Traffic | 45.05 | 58.85 | 18.23 | (D) 11.90 | 4.31 | 0.31 | 3.29 | (D) 9.41 | (D) 20.94 |
| General and miscellaneous | 4.31 | (D) 0.59 | (D) 3.41 | 0.82 | 5.66 | (D) 0.98 | 4.83 | (D) 2.73 | 1.14 |
| Transportation for investment—Cr. | (D) 27.09 | 381.68 | ..... | ..... | (D) 26.98 | ..... | 122.77 | 12.35 | (D) 82.42 |
| Total operating expense | 1.44 | (D) 0.15 | (D) 2.06 | (D) 0.32 | 1.66 | (D) 1.21 | 0.95 | (D) 1.34 | (D) 2.12 |

TABLE XIX—OPERATING STATISTICS—PER CENT INCREASE OR (D) DECREASE

| | City Companies | | | Interurban Companies | | | Combined Properties | | |
|---|---|---|---|---|---|---|---|---|---|
| Passenger car-miles | 1.18 | 1.64 | (D) 1.07 | 0.08 | (D) 3.23 | (D) 0.24 | (D) 1.66 | (D) 1.99 | (D) 7.17 |
| Total revenue-car miles | 1.12 | 1.77 | (D) 1.16 | 1.86 | 0.84 | 1.16 | (D) 1.24 | (D) 1.79 | (D) 5.83 |
| Revenue passengers | (D) 0.27[1] | 0.09 | (D) 1.93[7] | 8.24 | (D) 1.84 | (D) 14.62 | (D) 2.90[18] | (D) 6.14 | (D) 10.09[16] |
| Transfer passengers | 1.29[2] | 0.75[5] | (D) 2.80[8] | (D) 13.52[10] | 1.22[12] | (D) 4.05[15] | (D) 0.19 | (D) 9.31[17] | (D) 6.28[21] |
| Total passengers[1] | 0.06[1] | 0.16 | (D) 2.00 | 7.82 | (D) 2.03 | (D) 13.69 | (D) 2.60[18] | (D) 6.45 | (D)10.72[24] |
| Passenger revenue | 0.51 | 0.10 | (D) 1.26 | (D) 0.16 | (D) 5.97 | (D) 5.37 | (D) 1.73[19] | (D) 3.01 | (D) 8.89 |
| Revenue car-hours | 0.53[3] | 1.04[5] | (D) 2.36[9] | 6.99[10] | 3.21[13] | (D) 0.86[16] | (D) 2.03 | (D) 2.15 | (D) 7.91[7] |
| Passenger car-hours | 0.55[3] | 0.89[5] | (D) 2.65[9] | 8.96[10] | (D) 0.22[13] | 0.12[18] | (D) 2.01[19] | (D) 1.92 | (D) 8.62[7] |
| Miles of single track | 0.30 | 0.53 | (D) 4.27 | 0.68 | (D) 0.09 | (D) 0.13 | (D) 0.77 | 4.17 | (D) 2.61 |
| Passenger cars operated a | 0.12[4] | 2.15[6] | (D) 1.94[7] | 5.44[11] | 3.42[14] | 1.03[17] | (D) 1.42[20] | (D) 1.41[16] | (D) 10.07[7] |

a Average maximum number of passenger cars in service daily.

[1] Reported by 41 companies.
[2] Reported by 39 companies.
[3] Reported by 40 companies.
[4] Reported by 37 companies.
[5] Reported by 25 companies.
[6] Reported by 28 companies.
[7] Reported by 23 companies.
[8] Reported by 12 companies.
[9] Reported by 21 companies.
[10] Reported by 1 company.
[11] Reported by 3 companies
[12] Reported by 7 companies.
[13] Reported by 12 companies.
[14] Reported by 15 companies.
[15] Reported by 8 companies.
[16] Reported by 24 companies.
[17] Reported by 22 companies.
[18] Reported by 30 companies.
[19] Reported by 26 companies.
[20] Reported by 22 companies.
[21] Reported by 16 companies.
[22] Reported by 17 companies.

even operating conditions and some progress was made by certain companies in improving their situation. Their future progress depends upon the general attitude of the public toward them and the degree of sympathetic co-operation extended to them. There are signs that the peak of the public enthusiasm for motor buses was reached in the latter part of 1925 and that since then there has been a lot of sober second thought on the advantages of encouraging bus operation at the risk of jeopardizing the existence of the street railways. If this means that the problems of the latter are to receive more adequate consideration in the future, the confidence of the railways in increasing their service may be justified.

**Net Income Higher.**—For the nine months period ended March 31, 1927, operating revenues of the Brooklyn-Manhattan Transit System, Brooklyn, N. Y., were $34,732,911, against $33,295,344 for a similar period ended March 31, 1926. Total operating expenses increased from $21,709,745 to $22,477,848 for nine months period ended March 31, 1927. After consideration of income deductions net in 1927 was $4,686,588 and $4,096,251 for 1926.

## Chicago Surface Lines Report Increased Business in March

Total rides on the Chicago Surface Lines in March were 137,027,327, compared with 131,839,632 in the corresponding month in 1926 and 123,768,252 in February of this year. Service was increased to the extent of 432,760 car-miles, or 19,127,922 seat-miles, compared with the similar month of last year, much of the increase being in the off-peak hours to meet increased demand for service in the middle of the day and in the evening. There has been an increase in riding during the first three months of the current year of approximately 2.8 per cent over the corresponding period of 1926.

Gross earnings for the month of March were $5,334,409, compared with $5,127,371 for the similar month last year. Divisible receipts were $387,898, compared with $154,141 in March, 1926. In February gross earnings were $4,842,125 and divisible receipts were $304,380. The companies spent $687,291 during March on right-of-way, structures and equipment.

## Balance in Detroit Increases

For the year ended March 31, 1927, the total operating revenue of the Department of Street Railways at Detroit, Mich., was $24,588,298, against $24,009,932 for the year ended March 31, 1926. These figures included a railway operating revenue and a coach operating revenue in 1927 of $21,999,438 and $2,588,859, against $22,895,754 and $1,114,178 respectively. Total revenue from all sources was $24,866,897, against $24,217,265 in the 1926 period. Total operating expenses were $19,007,825, against $18,231,202. The 1927 expense figure included a railway item of $16,619,335 and a coach item of $2,388,489. The 1926 total expense figure was made up of $17,132,113 for railway and

$1,099,088 for coach. Net revenue from all sources was $5,859,072, against $5,986,062 for the period ended March 31, 1926. The net income was $3,189,417, against $3,319,150. Balance for the period ended March 31, 1927, was $589,189, against $572,038. Railway passengers numbered 471,992,768 in 1927 and 492,491,738 in 1926. Coach passengers numbered 32,576,380 for the year ended March 31, 1927, against 14,827,100 for the year ended March 31, 1926. Railway revenue car-miles totaled 51,043,152 in 1927, against 54,729,579 in 1926. Coach-miles totaled 10,312,493, against 4,817,942 in the 1926 period.

## Ohio Road Sold Under Foreclosure

J. P. Longon purchased the Cincinnati, Georgetown & Portsmouth Railroad at receiver's sale on April 25 for $225,000, the appraised valuation. No other bid was offered. Title will not pass to the new owners until the sale has been approved by Judge Stanley Struble of the Common Pleas Court. The sale was ordered as the result of a suit to foreclose the mortgage filed by the Union Savings Bank as trustee for the bondholders after continued failure to earn interest on bonded debt.

The C., G. & P. is a 42-mile interurban connecting Cincinnati with Georgetown, Ohio. Indications are that operation will continue under control of the new owners, said to represent the bondholders.

## Disposition of Broadhead Properties Discussed

Accounting made to the court in connection with the estate of S. B. Broadhead, largely interested in the electric railways centering in Jamestown, N. Y., shows that except for two which were abandoned the lines have become self-sustaining from an operating viewpoint and now require no further advances from the estate for their operation. There have been, however, and must continue to be some substantial advances for capital expenditures such as new cars and equipment in order to render the roads successful from an operating viewpoint.

As to the Jamestown, Westfield & North Western Railroad, the report contains a large amount of operating detail but summarizes the position of the administrators as follows:

> It was realized that this road was dependent upon its freight business for its future success as the passenger business was diverted by private automobile. An appeal was made to the manufacturers of Jamestown to sustain this railroad by giving it a fair proportion of their freight. This appeal met with a substantial response, the freight revenues of the road have largely increased, a new locomotive has been built entirely in the shops of the company from old materials on hand and the company is now in position to handle large quantities of freight.
>
> It is recommended, and unless instructed to the contrary, your administrators will continue its operation until further accounting. But unless its operation yields better net results than heretofore, it will not recommend its continuance indefinitely. Permanency of operation can only follow from two things. First, substantial increase in freight patronage; second, relief from exorbitant taxation—it being assessed in nearly every tax district out of all proportion to its earning value. Effort will be directed to accomplish both.

As to the Jamestown Street Railway, the report states that the company enjoyed an increase of $25,778 in net revenues in 1926 as against 1925. The report recommends the continuance of the Jamestown Street Railway and of the Jamestown Motor Bus Company by the estates.

## Rockford Property Acquisitions Expanded

Milton J. Ellis and his associates, operating the local railway at Rockford, Ill., and the interurban system, have purchased the interurban line between Belvidere and Elgin, Ill., with about 36 miles of track from Bion J. Arnold and will take over the property on May 1. The Rockford & Belvidere Railway and the Elgin & Belvidere Electric companies are consolidated by the deal and offices will be established in Rockford. Negotiations are now under way with the Chicago, Aurora & Elgin third-rail system for through service from Chicago to Freeport and this deal is said to have been favorably received by the third-rail officials. A new company will be formed to operate the line, working with $1,000,000 capitalization, which will issue $400,000 of 6 per cent mortgage bonds and $600,000 common stock. Rehabilitation of the line and establishment of freight service between Rockford and the eastern points are contemplated. Some of the eight new and fast interurban cars now being manufactured for the Ellis lines will probably be put in service on the Freeport-Elgin line.

**$55,953 Added to Youngstown Value.**—Value of the Youngstown Municipal Railway, Youngstown, Ohio, was increased $55,953 when the Youngstown City Council approved plans for a garage on Mahoning Avenue. The money is to purchase pumps, large storage tanks and equip a machine shop to make repairs on all buses.

**To Increase Capital.**—The American & Foreign Power Company, Inc., under the supervision of the Electric Bond & Share Company, has called a special meeting of stockholders for May 2 to vote on an increase in the authorized stock. This company controls railway properties in Cuba. It proposes to issue 200,000 shares of a new class of $6 preferred stock and to increase the second preferred stock, series A, to 1,600,000 shares from 120,000 shares and to increase common stock to 8,300,000 from 1,800,000 shares. Plans are being formulated and steps taken looking to the acquisition by the company of additional hydro-electric power and other utility properties in foreign countries.

**Service in Peterborough Ceases.**—Negotiations between the city of Peterborough, Ont., and the Hydro-Electric Power Commission looking toward the sale of the Peterboro Radial Railway System failed and service has ceased. It is claimed by the Hydro-Electric that the railway is operated at a loss of $50,000 a year. The city offered $150,000 for both railway and gas works. The price set by the Hydro-Electric is $575,000 for the two. It is believed an offer will be made to a private bus company. If the Hydro-Electric fails to operate cars for 90 days the franchise lapses and the city may take over the system.

**Profit in Ogden.**—A profit of $8,613 was realized by the Utah-Idaho Central Railroad, Ogden, Utah, for the period between Nov. 21, 1926, and Jan. 1, 1927, according to a report for that period made to the Public Utilities Commission of Utah. This company took over the property of the old concern, known as the "Utah-Idaho Central Railroad Company" at that time, the old company reporting to the commission for the preceding months of the year. Operating revenues of the new concern from Nov. 21 to the last of the year amounted to $78,081, while operating expenses are listed at $60,644. This left a net operating revenue of $17,437, from which taxes amounting to $8,039 had to be deducted. Non-operating income for the period was $23, which brought the gross income to $9,421. From this sum $807 interest on the funded and unfunded debt was deducted, leaving the balance noted.

**Deficit in Toledo in March.**—Weather propitious for walking and increased use of private automobiles brought about a decrease in patronage for the Community Traction Company at Toledo, Ohio, in March and resulted in a deficit from operations of $12,190 after caring for various funds set up in the Milner service-at-cost ordinance. The total deficit in the stabilizing fund is now $960,834.

**Would Scrap Certain Lines.** — The Hudson Valley Railway plans to curtail further its lines in the district of Albany, N. Y., if the stockholders and the Public Service Commission approve. The plan is to scrap the Fort Edward-Stillwater line and to do away with the Glens Falls-South Glens Falls line and the South Street railroad station line in Glens Falls. These proposals will be submitted to stockholders at a meeting in New York City on May 25. The commission some time ago denied the application for discontinuance of the Lake George-Warrensburg line and the Greenwich-Thomson line. There has been a renewal of this petition.

**Gross Earnings Show Increase.**—For the first time since the city of Seattle, Wash., has been operating the Seattle Municipal Street Railway system a quarterly report shows an increase in gross earnings. The financial statement for January, February and March gives the total gross revenue as $1,426,646, an increase of $1,902 over that of the first three months in 1926. The expense of operation for the first quarter of this year was $1,000,501, against $1,088,040 in 1926, a decrease of $87,539. The payroll total was $730,725, which is $85,705 less than one year ago.

**Net Income Lower.**—For the nine months ended March 31, 1927, passenger revenue of the Brooklyn City Railroad, Brooklyn, N. Y., was $8,519,645, against $8,462,853 for a similar period of the year previous. Operating expenses and taxes increased from $7,226,214 in 1926 to $7,421,084 in the 1927 period. After the consideration of income deductions the net corporate income was $862,561, against a net income of $1,050,388 for the nine months ended March 31, 1926.

# Personal Items

## Personnel Changes Announced in Duluth

With the recent resignation of H. H. Brown as superintendent of the Duluth Street Railway, Duluth, Minn., announcement was made by Herbert Warren, vice-president and general manager, of several changes in the company's organization. W. S. Byers will be Mr. Brown's successor and B. G. Noah will fill Mr. Byers' present position as assistant to Mr. Warren. The changes are effective on May 1.

Mr. Byers, who will take charge of the superintendency of the Duluth division, has been an employee of the railway for more than 26 years. He has been assistant to Mr. Warren for a number of years and is well known throughout the city.

B. G. Noah, who is now a resident of Chicago, will go to Duluth on May 2 to assume his duties. He was in the employ of the Chicago City Railway and the Chicago Surface Lines from January, 1914, to February, 1917, as engineer of tests. The duties of this position consisted of making electrical and mechanical tests of substation transforming and converting equipment. In February, 1917, and up to July, 1917, he was engaged by the sanitary district of Chicago as testing engineer in charge of electrolysis mitigation. During the next two years he was in the aviation corps of the army and saw sixteen months service in France.

From July, 1919, up to the present time he has been with the Chicago Surface Lines as engineer of tests in charge of substation design and installation, his duties including the preparation of power statistics and distribution engineering. While in the employ of the Chicago Surface Lines he has also been consulting engineer for the Hammond, Whiting & East Chicago Railway. Mr. Noah completed his high school education in Kansas City, Mo., and in 1914 completed a four years course in electrical engineering at the Armour Institute of Technology.

H. H. Brown, who leaves the traction field to become associated with a large Eastern manufacturing concern, went to Duluth in 1911 as a clerk in the general manager's office. He has been superintendent since 1916 and has taken a leading part in the safety campaigns in the city. He is chairman of the statistical committee of the Chamber of Commerce safety bureau and has been on the executive committee ever since the organization of the safety division. Most of his time will be spent in Chicago.

H. H. Brown

W. S. Byers

B. G. Noah

## J. A. Greig Resigns from Toledo Company

James Ashton Greig has resigned as sales manager of the Community Traction Company, Toledo, Ohio, in charge of the new commercial department. He will leave this post on June 1. At the time of his appointment at Toledo, Mr. Greig had been editor of *Electric Traction* for three years. His work in Toledo was to help secure the proper balance between production and marketing, for he had had many years of experience in railway and merchandising work.

In his early days Mr. Greig decided law was to be his calling and to study for this career he took a position with the Marconi Wireless Telegraph Company, now the Radio Corporation of America. His radio experience shifted his viewpoint to engineering and in 1913 he received his engineering degree at the University of Wisconsin. He later was employed by the Western Electric Company. Then the war came and he was assigned to Radio Company A, 89th Infantry Division. At the close of the war he went to Chicago and was employed by the Fred M. Randall Advertising Agency as merchandising manager.

Mr. Greig joined *Electric Traction* in 1922 as editorial assistant. Later in that year he was made associate editor and the following year editor.

James Ashton Greig was born in Chicago in 1892. He completed his high school work at New Rochelle and later moved to Chicago. He was graduated from Northwestern University in the course of letters and science. During his summer vacations he served as newspaper reporter.

## Herbert Tuohy Assistant Traffic Manager at Springfield

Herbert Tuohy, former traffic commissioner of the Springfield Chamber of Commerce, has been appointed assistant traffic manager of the Illinois Traction System. Mr. Tuohy has offices at Springfield and Chicago, but devotes the major portion of his time to the Springfield office, in charge of W. H. Wylie, traffic manager.

Because of an extensive and varied experience in transportation and rate matters, Mr. Tuohy is especially well fitted for the new position, which is created as part of the Illinois Traction System's plan for intensive promotion of its services. The Illinois Traction System is continually entering a wider range of transportation activities, especially in the handling of through freight shipments, which requires an augmented staff of transportation experts.

Mr. Tuohy's first railway experience was gained in Peoria, Ill., where he was associated with the Rock Island, Chicago & Alton, and Illinois Central railways. In 1915 he went to Springfield, first as rate clerk and then as examiner and transportation expert for the Illinois Commerce Commission. Since 1921 he has served as traffic commissioner for the Springfield Chamber of Commerce, in which position he has been especially successful in maintaining relations between the shippers and the railways and at the same time protecting the interests of the city from a rate standpoint. During the World War Mr. Tuohy served with the A.E.F forces in France.

**Amon Ing** has been reappointed by Governor Baker of Missouri as a member of the Missouri Public Service Commission. His term will expire on April 15, 1933. Judge Ing was appointed to the board several years ago to fill an unexpired term.

# Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

## Space Applications for Cleveland Show Ready

Applications for show space at the Cleveland convention will be mailed to all members of the American Electric Railway Association on May 16. Thirty days are allowed for filing. All applications received up to the close of business on June 15 will be awarded space by the exhibit committee, which is scheduled to meet June 22 to make the official allotment. If any space remains unsold after the initial allotment has been made, it will be assigned by the director of exhibits in the order in which applications are received.

Exhibits will occupy both floors of the Cleveland Auditorium as well as the entire new west wing. The two buildings will be connected with a covered passageway in which there will be operating maintenance of way exhibits. Track space for the display of street cars will also be provided.

Railway materials, cars, buses and bus accessories, shop tools, garage equipment, etc., will be shown as well as many other items pertinent to the transportation industry. An unusually large and varied display is expected.

Hotel circulars giving rates for the convention together with application forms for reservations have just been mailed to the membership. This is the 46th annual gathering of the association. The convention dates are Oct. 3-7, inclusive. The show opens at 12 noon Saturday, Oct. 1, affording exhibitors an additional day and a half to show their wares.

## $500,000 Car Building Program in Milwaukee

With its new Burlington-East Troy cut-off scheduled for completion by midsummer and a still greater use of its Waukesha - Oconomowoc - Watertown Rapid Transit line looked for this year preparations are under way by the Milwaukee Electric Railway & Light Company to have sufficient equipment on hand to meet any demands made upon it by the public. For the present, plans in this direction include the addition of nineteen cars identical to those now in use on the Rapid Transit line to cost $442,000. All of this equipment, which will comprise fourteen motor cars and five trailers, will be built in the company's Cold Spring shops, except four all-steel motor cars which are now being built by the St. Louis Car Company for delivery in July.

Completion of the present car construction program will give the company a total of 45 de luxe cars, interchangeable from one line to another. Improvements in cars provide for the installation of treadle equipment, together with new seating and lighting equipment on 45 city cars. Conversion of these cars for one-man operation will cost approximately $117,500. With this work completed more than half of the company's city cars will be of the one-man type.

## Chicago Surface Lines Adds New Automatic Sub

A new 4,000-kw. automatic substation, the first of its kind ever used on the system, has recently been completed and placed in operation by the Chicago Surface Lines on Grimm Avenue, Chicago. It furnishes power for three important cross-town lines in the north and northwest portions of the city, all formerly fed from the substation at Crawford and Ravenswood Avenues.

The new substation was built at a cost of approximately $143,000. It is equipped with two 2,000-kw., 600-volt, 60-cycle synchronous converters. The various units cut in automatically as the need for additional power is felt. The station is equipped with a high-speed supervisory control system which enables the operator at the Crawford Avenue substation, 2½ miles distant, to control both units and all feeder sections.

The erection of the substation is in line with the policy of the Chicago Surface Lines management to keep pace with demands, in spite of the handicap of an expiring franchise. The addition of 445 new cars and an increase of about 500,000 seat-miles operated in more than three years necessarily calls for a marked increase in power. Power consumed by Surface Lines operations last year was approximately 560,000,000 kw.-hr.

# Metal Prices Sag in Dull Market

COPPER, lead, zinc, tin, silver and platinum were all selling on April 27 at lower prices than last week, both in New York and in London, but the lower prices are not attracting many buyers.

Copper was held at 13½ cents Valley delivery last Thursday, but as early as Friday at least one seller was willing to book orders at 13 cents and did a fair business during the next few days at that level, as most others were quoting 13½ cents. Producers' ranks gradually weakened to the 13-cent level, however, and that price was general on April 27.

Business has reverted to the quietude that characterized the market in March and no great activity is expected until the April statistics are issued about May 10. Indications are that these will be distinctly favorable and will confirm the March trend. Companies manufacturing brass and sheet copper report a continuance of excellent business, fully up to the 1926 rate, though wire business is slack. May copper seems to be pretty well contracted for; producers are well sold on this position and consumers do not seem anxious for prompt shipment. One good block of copper was sold for delivery as far ahead as July and August.

The export market has been lifeless until April 27, when the export association reduced its c.i.f. price from 13.50 to 13.35 cents, resulting in a little more buying. Most of the inquiry abroad is for prompt shipment.

### Curtailment in Zinc Production

Zinc sold at varying prices between 6.25 and 6.35 cents at St. Louis on April 21, with the largest volume at the lower limit. Since then the market has gone as low as 6.10 cents for all deliveries, at which level a fair business was done on Monday and Tuesday. Sales have been at about the same rate as during the last five weeks and well below the average rate for the year to date. Further curtailment in production is likely as ore approaches $40 a ton, $41 being last Saturday's figure; this is the logical remedy for the situation. High grade is now offered at 8 cents delivered in the East.

A moderate volume of lead business was transacted in the St. Louis market during the week ended April 27, though at definitely lower price levels, 6.55 cents being the prevailing figure since April 25. The New York market has been exceedingly dull and except for contract sales very little lead has brought the Smelting company's official New York price of 7 cents. A price of 6.55 cents in St. Louis is equivalent to 6.90 cents in New York and this is very close to parity with London for foreign ore lead.

The speculative situation in London caused a decline in tin to a low of 66½ cents for prompt Straits on April 25. Since then both the foreign and domestic markets have recovered some of the lost ground.

METAL, COAL AND MATERIAL PRICES
F. O. B. REFINING

| Metals—New York | April 26, 1927 |
|---|---|
| Copper, electrolytic, cents per lb. | 12.775 |
| Copper wire, cents per lb. | 15.125 |
| Lead, cents per lb. | 6.95 |
| Zinc, cents per lb. | 6.46 |
| Tin, Straits, cents per lb. | 66 75 |
| **Bituminous Coal, f.o.b. Mines** | |
| Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons | $4.475 |
| Somerset mine run, Boston, net tons | 1.875 |
| Pittsburgh mine run, Pittsburgh, net tons | 2.25 |
| Franklin, Ill., screenings, Chicago, net tons | 2.50 |
| Central, Ill., screenings, Chicago, net tons | 2.00 |
| Kansas screenings, Kansas City, net tons | 2.50 |
| **Materials** | |
| Rubber-covered wire, N. Y., No. 14, per 1,000 ft. | $5.50 |
| Weatherproof wire base, N. Y., cents per lb. | 16.75 |
| Cement, Chicago net prices, without bags | 2.05 |
| Linseed oil (5-bbl. lots), N. Y., cents per lb. | 11.30 |
| White lead in oil (100-lb. keg), N. Y., cents per lb. | 14.50 |
| Turpentine (bbl. lots), N. Y., per gal. | $0.645 |

## Virginia Electric Power Company Operating New Cars

As recorded in the JOURNAL for March 26, the American Car Company of St. Louis has delivered five of the ten cars ordered in December, 1926, by the Virginia Electric & Power Company, Norfolk, Va. The new rolling stock is of the closed, city passenger, semi-steel type with a seating capacity of 44. Almost immediately upon receipt the cars were put in service on the Port Norfolk and Pinners Point line of the Portsmouth division. Prior to this, the company staged a parade for the new equipment, and had as its guests City Manager Hanrahan, representatives of civic associations, and the press. The hosts on this occasion were J. Frank McLaughlin, then vice-president Norfolk division; T. Norman Jones, general manager Norfolk division, and S. J. Pope. Before the trial run and parade, an inspection was held at the intersection of High and Court Streets, Portsmouth. The trial trip was made around the Crawford Street loop, thence to Mount Vernon Avenue on High Street and return. Complete specifications are as follows:

| | |
|---|---|
| Type of car | One-man, two-man, motor, passenger, city, single-end, double-end, double-truck |
| Builder of car body | American Car Co., St. Louis, Mo. |
| Date of order | Dec. 1, 1926 |
| Date of delivery | March 1, 1927 |
| Weight, total | 36,000 lb. |
| Bolster centers | 19 ft. 7½ in. |
| Length over all | 41 ft. 8½ in. |
| Truck wheelbase | 5 ft. 4 in. |
| Width over all | 8 ft. 5 in. |
| Height, rail to trolley base | 11 ft. 0 in. |
| Body | Semi-steel |
| Roof | Arch |
| Doors | End |
| Air brakes | Westinghouse |
| Armature bearings | Plain |
| Axles | Brill |
| Bumpers | Channel |
| Car signal system | Faraday |
| Car trimmings | Statuary bronze |
| Control | Westinghouse K-25 |
| Couplers | Pocket |
| Curtain fixtures | National Lock Washer ZO |
| Curtain material | Pantasote |
| Destination signs | Hunter |
| Door mechanism | National Pneumatic |
| Doors | Folding |
| Fare boxes | Johnson |
| Finish | Enamel |
| Floor covering | Linoleum |
| Gears and pinions | Westinghouse |
| Hand brakes | Peacock staffless |
| Hand straps | Rico |
| Heaters | Consolidated |
| Headlights | Ohio Brass ZP |
| Headlining | Haskelite |
| Interior trim | Mahogany |
| Journal bearings | Plain |
| Journal boxes | Symington |
| Lightning arresters | Westinghouse |
| Motors | Four Westinghouse, No. 510, inside hung |
| Safety car devices | Safety Car Devices Co. |
| Sanders | Ohio Brass |
| Sash fixtures | O. M. Edwards |
| Seats | Heywood-Wakefield |
| Seating material | Genuine leather |
| Slack adjusters | Westinghouse |
| Springs | Brill |
| Steps | Folding |
| Step treads | Feralun |
| Trolley catchers | Ohio Brass |
| Trolley base | U. S. No. 20 |
| Trucks | Brill No. 177 E1X |
| Ventilators | American Car Co., six per car |
| Wheels | Standard 27 in. |
| Wheelguards | H-B lifeguards |
| Special devices | E. Minier window cleaners |

Front platform showing control equipment of the new Virginia Electric & Power Company's cars, five of which were delivered late in March by the American Car Company of St. Louis. These cars were immediately put in service on the Port Norfolk and Pinners Point line

Latest city type passenger car to be placed in service by the Virginia Electric & Power Company on its Portsmouth division

## $77,550,581 in General Electric Orders in First Quarter

Orders received by the General Electric Company for the three months ended March 31, 1927, total $77,550,581, compared with $86,433,658 for the same quarter in 1926, a decrease of 10 per cent.

The statement of earnings for the first three months of 1927 follows:

| | |
|---|---|
| Net sales billed | $72,474,474 |
| Less: Cost of sales billed, including operating, maintenance and depreciation, charges, reserves and provision for all taxes | 63,641,300 |
| Net income from sales | $8,833,173 |
| Other income, less interest paid and sundry charges | 2,838,557 |
| Profit available for dividends | $11,671,731 |
| Less: Cash dividends on special stock | 643,587 |
| Profits available for dividends on common stock | $11,028,143 |

The net earnings are equivalent to about $1.53 a share on the 7,211,481 shares of no par value common stock outstanding.

## $4,500,000 for Shops for Chicago Rapid Transit Company

A $4,500,000 shop construction program has been launched by the Chicago Rapid Transit Company in Niles Center, with the ultimate object of consolidating all shops in this one location.

Ten separate units covering an area of 15 acres are included in the completed project. The structures will be so laid out and connected as to afford the utmost efficiency in the handling of cars and equipment.

Construction work is now under way on the first unit of the big group, which will be one of the most complete and extensive mechanical plants in the country. This unit is the paint shop, which is 200 ft. x 224 ft. in outside dimensions. Present indications are that this building will be ready for occupancy some time in May.

Architect's drawing of new Niles Center shops

All the buildings in this comprehensive construction program have been designed with a view to making them architecturally attractive and in harmony with other structures in this suburban community. The walls are of Old English mission brick with cast stone trimmings. B. J. Fallon, vice-president, said:

Consolidation of all the shops of the Rapid Transit lines in one convenient location is a logical step in development and expansion of our properties. When the elevated lines were brought under one management it was necessary to continue use of the various shops scattered over the city. Present requirements, however, call for a centralized plant where all work can be done with the greatest efficiency and despatch.

The new shops will greatly facilitate the work of keeping our rolling stock in perfect condition and thereby increase our ability to give the people of metropolitan Chicago the utmost in safe, fast and reliable transportation service.

The present divisional shops will be used for inspection purposes and the making of minor repairs after the new plant has been completed. Provision is made for adequate expansion of the new shops as necessity arises.

## *Track and Line*

**Piedmont & Northern Railway, Charlotte, N. C.,** is reported as considering an extension of its electric line from Charlotte to Danville, Va. Plans call for an extension from Charlotte to Lexington, N. C., and from Winston-Salem, N. C., to Danville by way of Reedsville.

**Milwaukee Electric Railway & Light Company, Milwaukee, Wis.,** has been granted the right by the City Council to build a rapid transit cut-off for a distance of ten blocks in the city limits. As part of the new work the company will relocate part of its Milwaukee-Waukesha and Watertown rapid transit line for a block south of the right-of-way, instead of along Fairview Avenue. Gates will be placed at all crossings.

## *Trade Notes*

**Chicago Fuse Manufacturing Company, Chicago, Ill.,** manufacturer of Union and Gem fuses and conduit fittings, announces the appointment of W. A. Wilcox as district sales manager, with headquarters at St. Louis. Mr. Wilcox will have charge of sales over southern Illinois, eastern Missouri, western Tennessee, Mississippi, Arkansas and Louisiana. Prior to this appointment Mr. Wilcox was associated with the Economy Fuse & Manufacturing Company for more than eight years.

**Earl E. Knox,** who for twenty years has represented Bury Compressor Company in the Pittsburgh district, has been appointed general sales manager, in full charge of sales and advertising, and will be located at Erie, Pa.

**Joseph V. Smith,** formerly general manager of the shovel interest of Hubbard & Company, Pittsburgh, has been appointed Pacific Coast manager for the electrical materials department of the company with headquarters at the Oakland, Cal., plant.

**Pittsburgh Testing Laboratory, Pittsburgh, Pa.,** to serve better its many clients in the rapidly growing Youngstown district has equipped its branch there for all kinds of physical lists on engineering and construction materials. A part of the equipment is a 200,000-lb. Universal Olsen testing machine. H. L. Christman, a resident in that section for many years and well known to the manufacturing interests there, is in charge of the plant. Mr. Christman has been identified with the testing and inspection profession for more than twenty years.

**Tuco Products Corporation, 30 Church Street, New York City,** announces the appointment of Carl H. Kadie as successor to Frank N. Grigg, who for the past fourteen years has represented the company in the Southeastern territory. Mr. Grigg resigned on account of ill health. His successor's appointment took effect April 1.

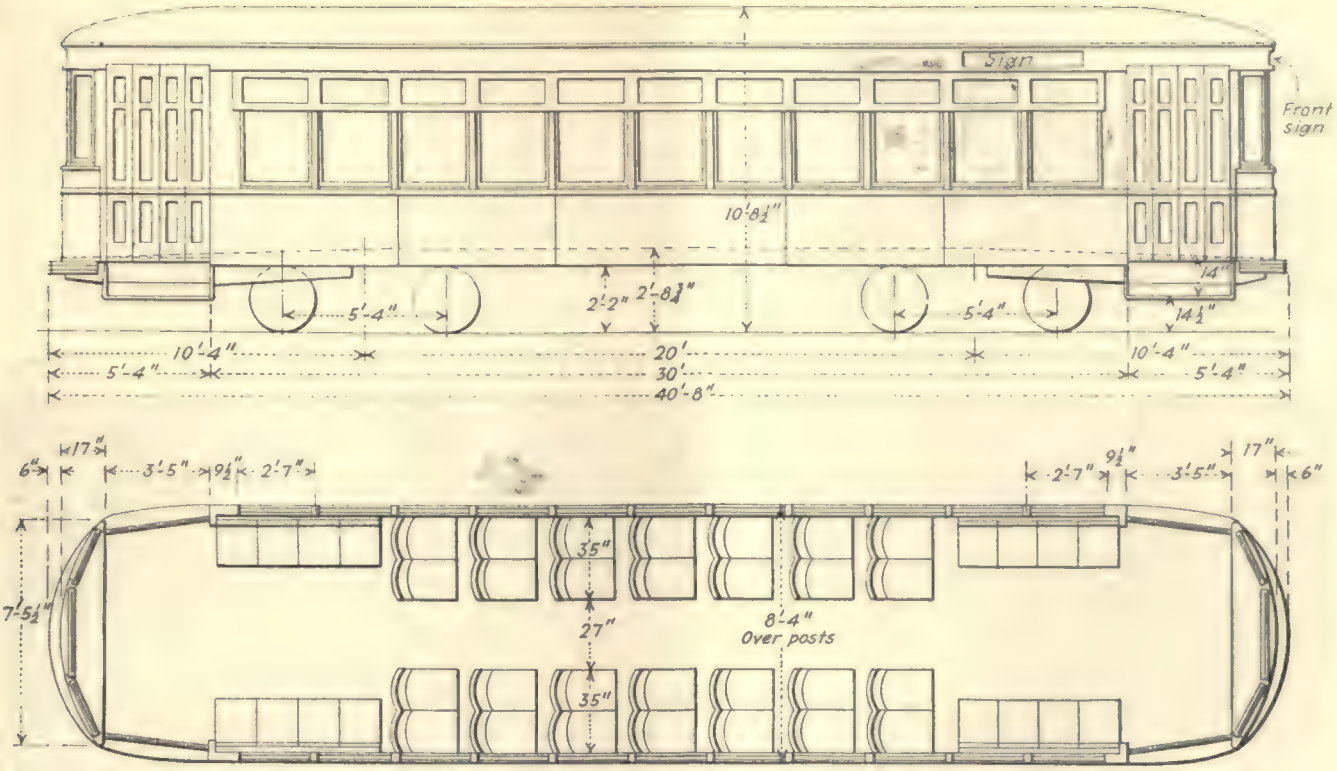
## *New Advertising Literature*

**Sullivan Machinery Company, Chicago, Ill.,** has published bulletin 81-I, second edition, on Sullivan concrete breakers. It describes two types of tools, a 75-lb. or heavy-duty buster and a 48-lb. light buster. The bulletin is liberally illustrated to show different applications of concrete breakers in many parts of the country. In addition to the familiar uses, for breaking up pavement or building walls, etc., pictures are shown of busters digging a tunnel in hard sandstone, driving sheet piling, excavating slag under an open hearth steel furnace, used as a pneumatic spade for digging hard pan, breaking down a mountain of furnace slag, which rock drills would not handle, and trimming the walls of a trench for electric conduits.

**Crouse-Hinds Company, Syracuse, N. Y.,** is mailing a decorative circular describing its new "Obround" condulets Form 7. An orange color scheme is skillfully employed to set off the various cuts. The new condulets are also listed in catalog No. 2100.

**Martindale Electric Company, Cleveland, Ohio,** issued on April 1 Catalog No. 8 describing its motor maintenance equipment. Among other things the catalog includes a center-page spread of a carbon brush maintenance and trouble chart.

**Sullivan Machinery Company, Chicago, Ill.,** has published bulletin 76-G, second edition, on Sullivan electric portable hoists. Sullivan single and double drum electric portable hoists are described, together with many application pictures. The adaptability and power of these small machines, having a 6½-hp. motor, is graphically shown. The single-drum hoist is used for such jobs as car pulling, erecting steel on derricks or with gin poles, decking logs from railway cars, pulling coal cars in mines, unloading box cars with a scraper, while the double-drum unit is employed for jobs requiring two ropes such as scraper loading in mines, trimming coal piles at power plants, operating conveyor systems in coal mines or hauling sawmill refuse with a drag line and power rake.




Exterior and floor plan of new Worcester-Springfield cars


# New England Electric Railways, on 100 new cars, again specify—

The "Peacock" Staffless

"PEACOCK"
Reg. U. S. Pat. Office.
STAFFLESS BRAKES

To more completely modernize its street railway subsidiaries in Springfield and Worcester, Mass., the New York, New Haven & Hartford Railroad placed orders for 100 double-truck, light-weight, one-man, city type, semi-steel cars. Fifty of these cars will be built for the Worcester Consolidated Street Railway and fifty for the Springfield Street Railway.

This repeat order of *"Peacock"* Staffless Brakes follows the use of these brakes for many years on the cars of these electric railways—during which period their performance has demonstrated beyond a doubt their superiority to any other hand brake.

May we furnish you with detailed information as to why nearly all modern car specifications include *"Peacock"* Staffless Brakes?

## National Brake Company, Inc.

890 Ellicott Square Buffalo, N. Y.

*Canadian Representative:*
Lyman Tube & Supply Co., Ltd., Montreal, Canada

# What SUPERTWIST Adds to Goodyear Tires

*One of the 70 motor coaches of the Kansas City Public Service Company, all equipped exclusively with Goodyear Pneumatic Cord Bus Tires*

You know what rugged strength and long life have always been built into Goodyear Pneumatic Bus Tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for Goodyear balloon tires, motorbus and heavy duty cord tires.

It far outstretches ordinary cotton cord, and has a maximum flexing power that yields under impact, protecting the tire from rupture, stone bruise and other injuries. It thus insures virtually *double* the *carcass* life of the tire.

Other exclusive features of the Goodyear Pneumatic Tire construction for motorbus service are (1) the new Goodyear band-building method; (2) the new Goodyear breaker; (3) the new Goodyear bead—patent applied for, and (4) the famous All-Weather Tread.

These advantages you get only in Goodyear Pneumatic Bus Tires—the only motorbus tires made of SUPERTWIST.

They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort and long, trouble-free mileage at low cost.

*Goodyear Means Good Wear*

GOODYEAR

Copyright 1927, by The Goodyear Tire & Rubber Co., Inc.

# finished in Duco..

THE photograph shows one of the six electric railway cars recently completed by the American Car Company of St. Louis, subsidiary of the J. G. Brill Car Company, for the Cincinnati, Hamilton and Dayton Railway Company. The exterior finish used on all six cars is Duco.

Duco has speedily gained popularity among operators in this section, the Penn-Ohio Electric Co. having standardized on Duco for all equipment. Endorsement of this nature is adequate testimony of the position held by Duco in the railway finishing field.

Some characteristics of Duco which particularly adapt it to this work are its fast drying properties—cutting drying time in the paint shop by 50 percent; the fact that even newly Duco finished cars can be dry-wiped without injuring the surface; and its ability to withstand sleet, alkali dust, scorching sun, flying cinders and the like without sacrificing beauty of appearance.

DU PONT DUCO

REG. U.S. PAT. OFF.

E. I. du Pont de Nemours & Co., Inc.,
Chemical Products Division, Parlin, N. J.
2100 Elston Avenue, Chicago, Ill.,
569 Mission Street, San Francisco, Cal.

There is only ONE Duco . . . . DU PONT Duco

# 20 of the world's leading bus and truck companies manufacture six-wheelers.

# 2000 six-wheelers are in service. 50,000,000 miles have been operated by these six-wheeled vehicles.

The reason for these facts should be known by every purchaser and operator of motor busses.

2 independent power operated brake systems on service and hand brakes—locomotive type brake shoes with all wearing parts lubricated—permanent dash with instrument panel—cast aluminum transmission cover and floor boards—70 gallon gas tank.

*Full particulars on request*

**THE SAFEWAY SIX-WHEELER**

THE SIX WHEEL COMPANY, 1800 W. LEHIGH AVENUE, PHILADELPHIA, PA.

*Manufacturers of De Luxe, City, and Double Deck Type Six-Wheel Coaches*

# accuracy

Long Products:

Automotive
Radiators
and Clutches

Accustomed to
manufacturing
to close limits.

LONG MANUFACTURING
COMPANY
Detroit Michigan

LONG

# Patrons are Pleased

*In* JACKSONVILLE *"I can recommend Graham Brothers Bus equipment to be the best value on the market both from first cost and operation basis," writes E. Gould, Florida operator.*

*In* WICHITA FALLS *"Any traction line intending to install bus service will not be disappointed in placing in their service Graham Brothers Motor Coaches," writes the Wichita Falls Traction Co.*

# GRAHAM MOTOR

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

# —Owners are Satisfied

## *Records of Coaches in Service are Daily Selling More Graham Brothers Motor Coaches—There can be no Stronger Endorsement of their Value*

Patrons who ride know Graham Brothers 21-Passenger street car type motor coaches for their good looks, their comfort and their dependability—They ride—and ride again, quietly, swiftly, safely.

Operators know Graham Brothers Motor Coaches for their excellence of design, workmanship and materials; for their low operating and maintenance costs; for their ability to stand up in this rigorous service.

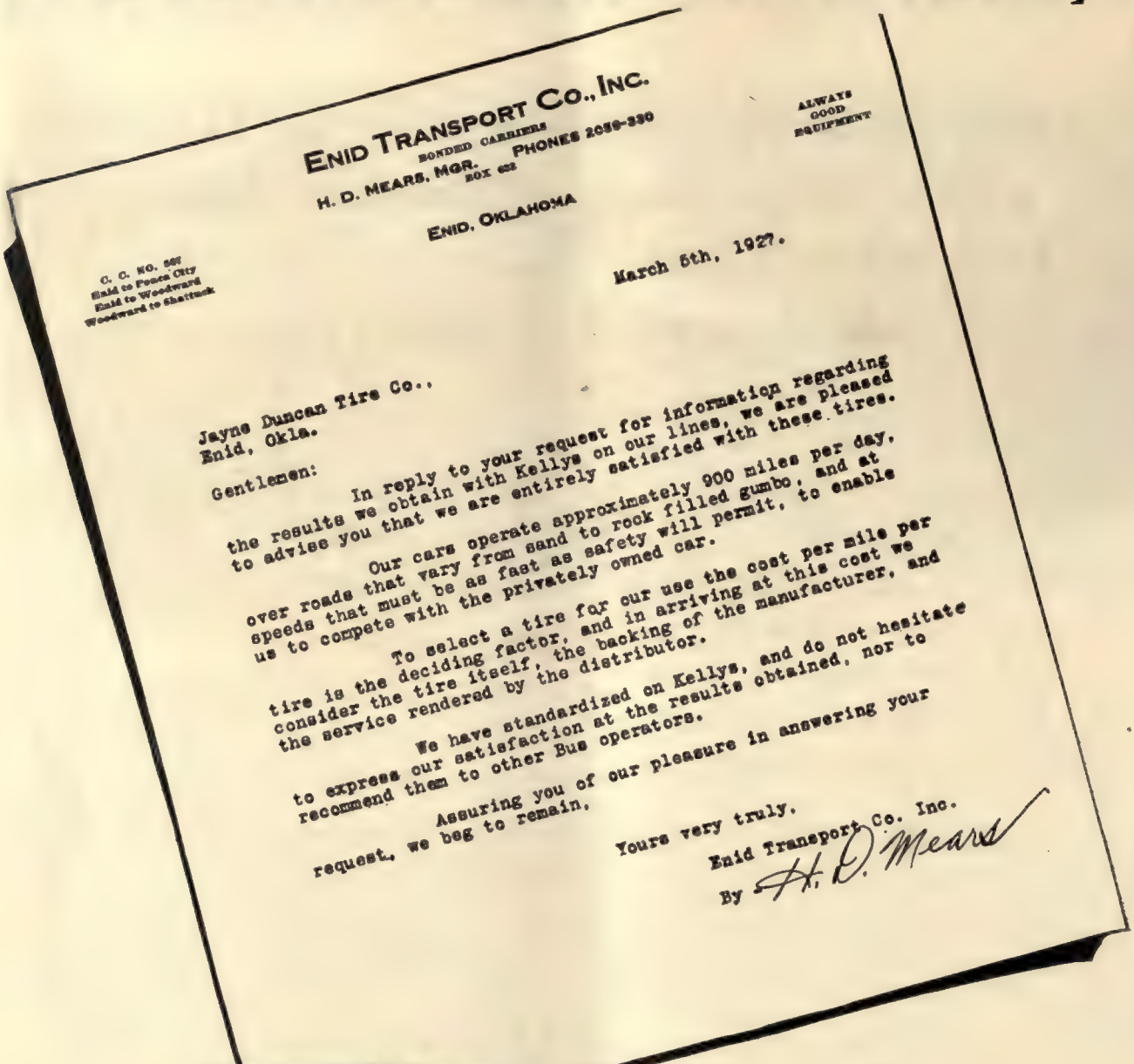
Operators know, too, that repair parts and repair service is available always from Dodge Brothers dealers everywhere.

GRAHAM BROTHERS
EVANSVILLE – DETROIT – STOCKTON
A DIVISION OF DODGE BROTHERS, INC
GRAHAM BROTHERS (CANADA) LIMITED, TORONTO, ONTARIO

**Standard 21-Passenger Street Car Type, complete, $3815**
**12-Passenger Parlor Coach, complete, $3750**
**16-Passenger Parlor Coach, complete, $3995**
*f. o. b. Detroit*

# BROTHERS COACHES

# "We have standardized on Kellys"



ENID TRANSPORT CO., INC.
BONDED CARRIERS
H. D. MEARS, MGR. PHONES 2030-330
BOX 622
ENID, OKLAHOMA

ALWAYS GOOD EQUIPMENT

C. C. NO. 567
Enid to Pecos City
Enid to Woodward
Woodward to Shattuck

March 5th, 1927.

Jayne Duncan Tire Co.,
Enid, Okla.

Gentlemen:

In reply to your request for information regarding the results we obtain with Kellys on our lines, we are pleased to advise you that we are entirely satisfied with these tires.

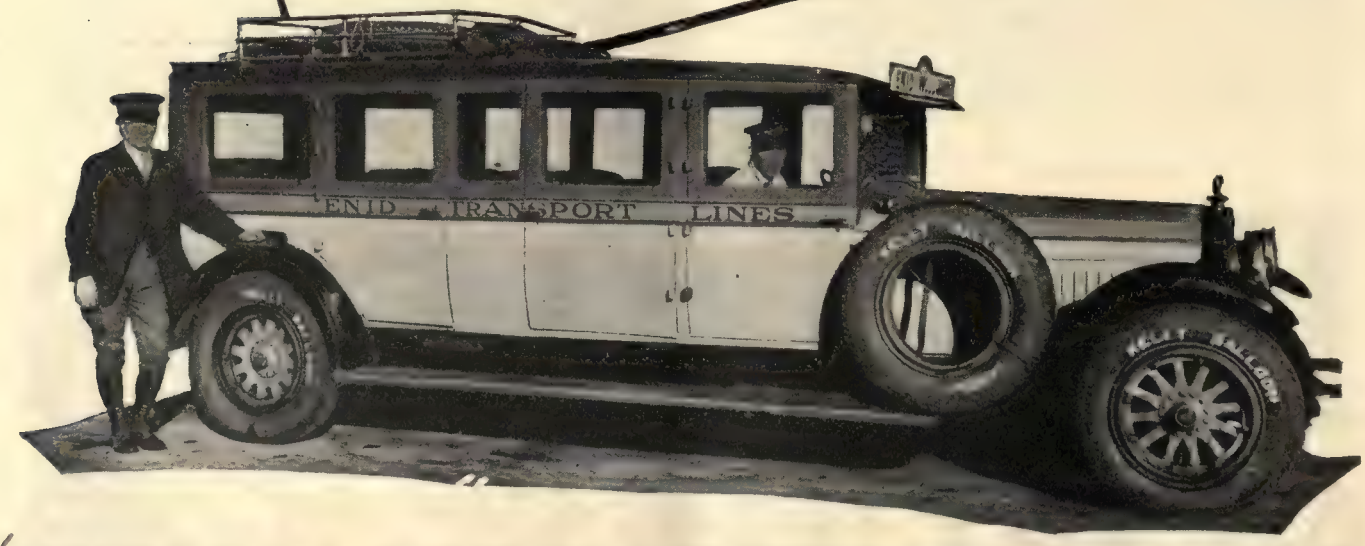
Our cars operate approximately 900 miles per day, over roads that vary from sand to rock filled gumbo, and at speeds that must be as fast as safety will permit, to enable us to compete with the privately owned car.

To select a tire for our use the cost per mile per tire is the deciding factor, and in arriving at this cost we consider the tire itself, the backing of the manufacturer, and the service rendered by the distributor.

We have standardized on Kellys, and do not hesitate to express our satisfaction at the results obtained, nor to recommend them to other Bus operators.

Assuring you of our pleasure in answering your request, we beg to remain,

Yours very truly,
Enid Transport Co. Inc.
By H. D. Mears




# KELLY-SPRINGFIELD TIRES

THE TWIN COACH represents the greatest advance yet made in highway transportation.

The chassis and body are combined in one unit. All stresses are equally distributed, the driving stresses being reduced one-half.

Two 60 H.P. motors are used, mounted midship, in each side of the body. Each rear wheel is driven direct by each motor. There is an equal distribution of the load on all four wheels and springs.

The overall length and breadth of the *Twin Coach* is available for carrying passengers. Its seating capacity is 42 and the weight per passenger seat is reduced 40 per cent. Safety is increased by driver being seated in extreme front end of coach, thereby having uninterrupted vision.

*Send for advance Booklet.*

# TWIN COACH

Patent Applied for

TWIN COACH COMPANY
F. R. FAGEOL, *Pres.*

120 Broadway, New York City

*Factories:*

Cleveland, Ohio
West 106th St.

Oakland, Calif.
c/o Fageol Motors Co.

EVEN new modern cars, if operated over rough track with broken joints, can scarcely be expected to win public approval and give satisfaction. The finest cars ever designed will not prove attractive as passenger carriers if they pound and crash at every rail joint. Neither can they be operated at their rated speed under such conditions.

Thermit-welding rails is one of the most inexpensive ways of seeking to improve public relations. It makes for quiet operation. Cars ride more smoothly over continuous rail. Chances of paving damage are greatly reduced, as there are no longer any jointed places to loosen up.

**Let us show you how it can be done at no more expense than any other method of joining rails.**

THERMIT

THERMIT

**METAL & THERMIT CORPORATION**

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

101 YEARS OF MANUFACTURING EXPERIENCE

Cane Webbing may be ordered through any H-W sales office.

No. 327-M

# FOR INTERURBAN NEEDS

THIS Heywood-Wakefield seat is designed for the modern type of interurban service where comfort is now so important. It has been selected for both new cars and for replacement use.

It has deep, double spring cushions shaped to allow more leg freedom. Mechanism rails are set in. The individual backs are properly pitched for comfort.

Our car seating experts will be glad to help you decide on the best seating equipment for your needs. This service is free through any H-W sales office.

*If you have not received a copy of our new Bus Seat Catalogue, write for it.*

Heywood-Wakefield
REG. U.S. PAT. OFF.

Heywood-Wakefield Co., Wakefield, Mass.; 516 West 34th St., New York, N. Y.; 439 Railway Exchange Bldg., Chicago, Ill. H. G. Cook, Hobart Bldg., San Francisco, Cal. The G. F. Cotter Supply Co., Houston, Texas. F. N. Grigg, 630 Louisiana Ave., Washington, D. C. The Railway & Power Engineering Corp., 133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada.

# "Noise and

MR. C. A. SMITH, *Superintendent of Roadways, the Georgia Power Company, with offices in the Glenn Building, Atlanta, Ga. Mr. Smith's study of electric traction problems has brought him nation-wide recognition.*

# track corrugation have been substantially reduced"

"OUR efforts in track construction have been directed toward two important factors," said C. A. Smith, Superintendent of Roadways, of the Georgia Power Company.

"Corrugation is a rather annoying problem here," Mr. Smith continued. "At times in the past we have found it necessary to grind rail that has been in service only one year. Noise, too, has been quite a problem, although we know definitely that our present method of construction has greatly reduced it.

"We use concrete beam construction under ties and rails—wood ties, spaced at about 4-foot centers, 80-lb. ASCE rail, the concrete beams extending 5" below the bottom of the tie. This type of construction including concrete pavement costs approximately seven dollars per foot of track. Our method of track insulation, we have reason to believe, has greatly reduced two of the most annoying problems the electric railway engineer encounters."

*In view of the intensive study Mr. Smith has devoted to track insulation problems, it is significant to note that Carey Elastite System of Track Insulation is being used extensively in the construction of the Georgia Power Company tracks. We shall be glad to tell you more about this efficient material—how easily it is installed and how it cuts vibration and noise to a minimum. Write for full particulars.*

THE PHILIP CAREY COMPANY, *Lockland,* Cincinnati, O.

*View of the Georgia Power Company Street Railway, on Hunter Street, Atlanta, Georgia. Note the interesting construction features, and the Carey Elastite System of Track Insulation in place.*

Carey Elastite

REG. U.S. PAT. OFF.

TRADE MARK REG'D. U.S. PATENT OFFICE

SYSTEM OF
TRACK INSULATION

CHARLES M. SCHWAB

# "Makers of Business Prosperity"

"BUSINESS journalism has established a great clearing house of information," says Mr. Schwab, probably as widely recognized for his human understanding of selling as for his capacity as a great manufacturer.

"You cannot have prosperity," says Mr. Schwab, "without confidence, and you cannot have confidence without a free and honest exchange of information."

* * * * *

That is the platform this publication stands on. Business publications which succeed are more than a collection of editorial and advertising pages.

* * * * *

Every publication has its specialized field of service and plays its part intimately in the interchange of information and opinion, which is the basis of prosperity to which the captain of steel refers.

* * * * *

Both editorial and advertising pages are made to fulfill this great responsibility. The men and methods the editors select for their pages and the advertising which the clients of this paper buy to inform its readers of their products, are brought together between the covers of a business journal for intimate help and service.

When you have read both editorial and advertising sections and you have a complete knowledge of the service the publisher of this journal has prepared for you; then you, like Mr. Schwab, will see it—a Maker of Prosperity.

The A. B. P. is a non-profit organization whose members have pledged themselves to a working code of practice in which the interests of the men of American industry, trade and professions are placed first—a code demanding unbiased editorial pages, classified and verified paid subscribers, and honest advertising of dependable products.

*This publication is a member of*

THE ASSOCIATED BUSINESS PAPERS, INC.

# For Performance In Culverts

IN culverts Toncan Iron means permanence. The iron has been thoroughly refined. Copper and molybdenum are added. The resultant alloy of the three elements is a corrosion resistance heretofore unknown.

The Toncan Culvert pictured is on the Brockton-Easton Line of the Eastern Massachusetts Street Railway Company.

"Toncan on the line" the country over means freedom from trouble and expense in the particular phase of the maintenance of way problem which it serves. Its selection by the Eastern Massachusetts Street Railway Company was based upon demonstrated performance. We will be glad to present the performance story of Toncan Culverts for your closer study.

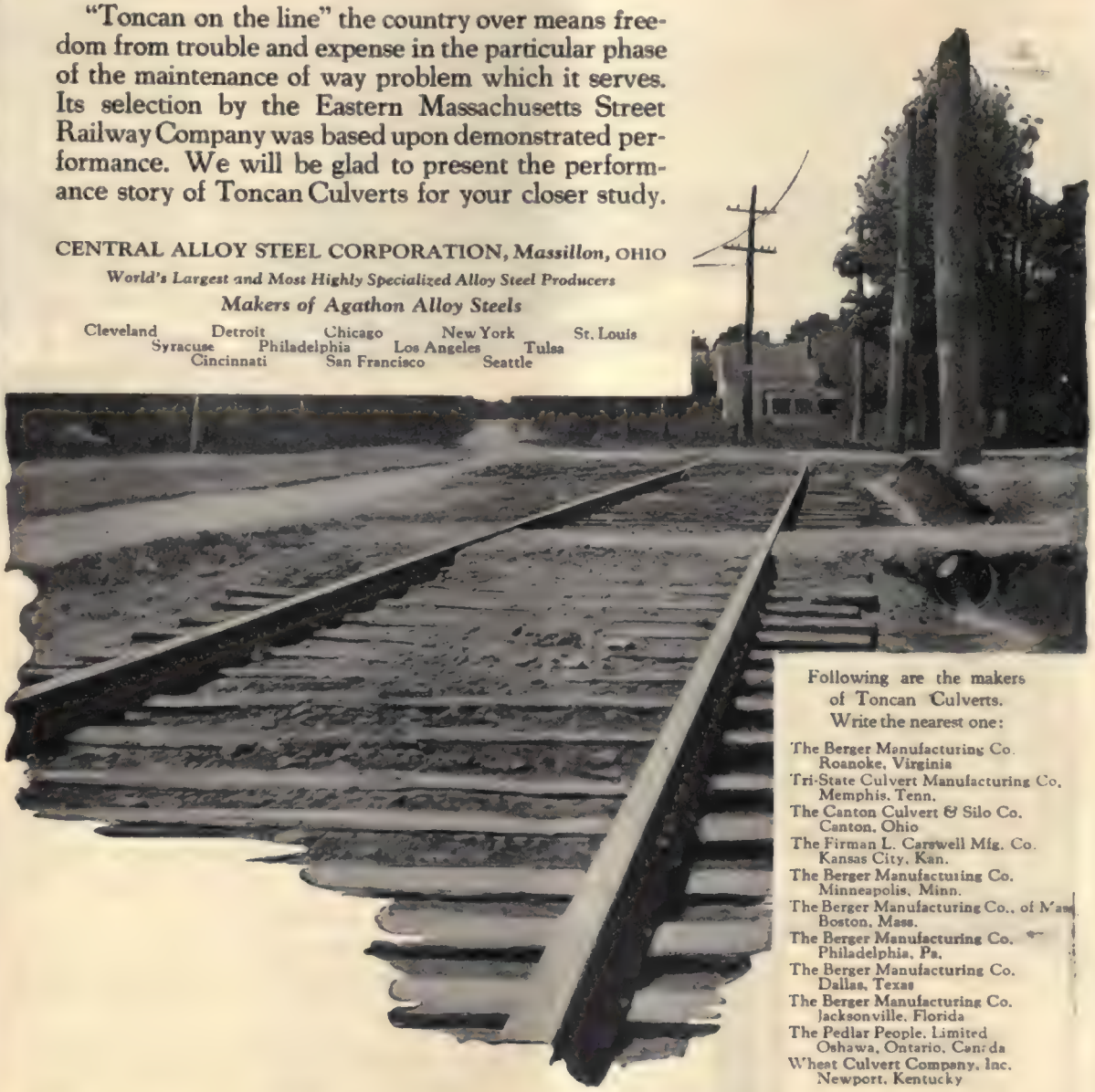
TONCAN
COPPER
Mo-lyb-den-um
IRON

CENTRAL ALLOY STEEL CORPORATION, *Massillon*, OHIO

*World's Largest and Most Highly Specialized Alloy Steel Producers*

*Makers of Agathon Alloy Steels*

Cleveland Detroit Chicago New York St. Louis
Syracuse Philadelphia Los Angeles Tulsa
Cincinnati San Francisco Seattle



Following are the makers of Toncan Culverts. Write the nearest one:

The Berger Manufacturing Co.
Roanoke, Virginia
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# 66 Street-Car Bus Operators told us what they wanted in the ideal bus

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". . . a dependable 6-cylinder motor capable of delivering maximum horse-power and maximum torque at comparatively low R.P.M. . . ."

# *and here it is—*

# The 75 is the answer Street-Car Bus

The Studebaker Big Six engine at 2400 r.p.m. develops 75 horsepower. Under full load it is practically vibrationless, due to the use of a fully machined crankshaft which is statically and dynamically balanced.

A heavy duty transmission with four speeds forward and one reverse permits easy operation on stiff grades with the engine at normal speed. All shafts and gears of special alloy steels. Silent at any speed.

Hotchkiss type drive. The torque and drive are taken through the extra powerful springs hung on short shackles. A 3-inch steel tube propeller shaft turns through 3 universal joints with a reduced driving angle due to low hung chassis.

A new design double-disc dry plate clutch, 17 inches in diameter is used for efficient service in this street car bus. It is smooth in engagement, easy to operate and simple to adjust.

Ignition is supplied by a vertical distributor and ventilated 12-volt, 156-watt generator with third brush regulation. Both units are gear driven from front of the engine crankshaft—positive and efficient.

PAST experience of actual users is the best foundation for forecasting a bus design to meet existing conditions. Therefore, Studebaker asked sixty-six street car bus operators what they considered the most essential features of an ideal street car type bus.

Then Studebaker engineers took the composite specifications as a basis and designed a heavy duty 21-passenger street car bus which would meet the requirements of the country's leading street car bus operators. The result is the new Studebaker "75" heavy duty chassis which has been thoroughly proved on Studebaker's 800-acre proving ground. Some of the outstanding features are detailed on these pages.

Characteristic Studebaker quality is the keynote of the entire structure. Rugged strength is insured by the use of special alloy steels and over-size parts. Exceptional roadability is obtained by a low center

Rapid deceleration and safety in traffic is obtained by mechanical, self-energizing four-wheel brakes with over-size drums. Correct leverages provide powerful braking action with light pedal pressure. Simplicity of adjustment is an appreciated feature.

A large tubular radiator rests on a box section frame which prevents weaving. Circulation is maintained by a six vane centrifugal pump. Carefully worked out passages in the cylinder block allow a free flow of water.

Semi-floating type rear axle with large Chrome Molybdenum shafts. Spiral bevel gear drive. Load carried on large roller bearings at wheel hubs and differential. Housing of heavy malleable iron, shaped to provide great truss strength.

## The New Studebaker 75

# to the requirements of Operators everywhere

**The New Studebaker "75"**
**Street Car Type Bus**
*(21 Passengers)*
**$5895**
*f. o. b. factory*

A sturdy cam and lever type steering gear, specially designed for use with balloon tires, with tapered roller bearings on steering pivots gives the driver ease of control at all speeds.

Cradled in a shock-proof hanger at the rear is a 30-gallon gasoline tank with a large bronze filler on the side for rapid filling. A hydrostatic gauge at the filler indicates, in gallons, the quantity of fuel in the tank.

Riding comfort is insured by the special Studebaker bus springs of the most improved design. Front, 38 inches long, 2½ inches wide with 14 leaves. Rear, 56 inches long, 2½ inches wide with 12 leaves. Extra heavy bolts and short shackles prevent side sway.

of gravity and a short turning radius. The front tires track with the center of the rear duals.

First cost is reduced to a minimum by large scale production in the huge Studebaker plants. Tests prove that this chassis averages 10 to 12 miles to the gallon of gas in city service. Greatly strengthened at all points where stress and wear occurs, maintenance expense is lower; and longer useful life is obtained, giving lower depreciation costs. For further details on the new "75" chassis write Dept. B, The Studebaker Corporation of America, South Bend, Ind.

### *Prices f. o. b. factory*

| | |
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| Studebaker "75" Chassis only* | $3275 |
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21-passenger seating capacity selected for comfortable seating arrangement. Records show this size bus most profitable in street car service. Ample standing space.

Equipment: front bumper; spare wheel and tire carrier; 34 x 7.50 (all wheels and tires interchangeable); powerful two-beam headlights; traffic lights; destination sign; 6 dome lights; signal system; heater; speedometer; 8-day clock; engine thermometer; oil pressure gauge.

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# Heavy Duty Chassis

# Seattle *knows* Studebaker Busses cost less to operate

THE cost figures of a fleet of five Studebaker pay-enter busses owned and operated by the City of Seattle Street Railway reveal some facts which are of interest to bus operators who contemplate the purchase of new equipment.

In Seattle, where many of the main streets have steep grades, bus operation is, of course, more expensive than in cities where the thoroughfares are generally level.

But in spite of this handicap and with the constant starting and stopping of city traffic, five Studebaker busses operated by the City of Seattle Street Railway, during the first eight months of service averaged 9 miles to the gallon of gasoline. A total of 215,138 miles was run at an average operating expense of .0454 per mile. This figure included fuel, oil, grease, tires, service repairs, but does not include depreciation, driver's wages or operating overhead.

Lower
—*first cost*
—*operating cost*
—*depreciation cost*
—*maintenance cost*

Such examples of Studebaker economy, of which there are many throughout the country, prove the value of Studebaker busses for mass transportation.

B 5-27

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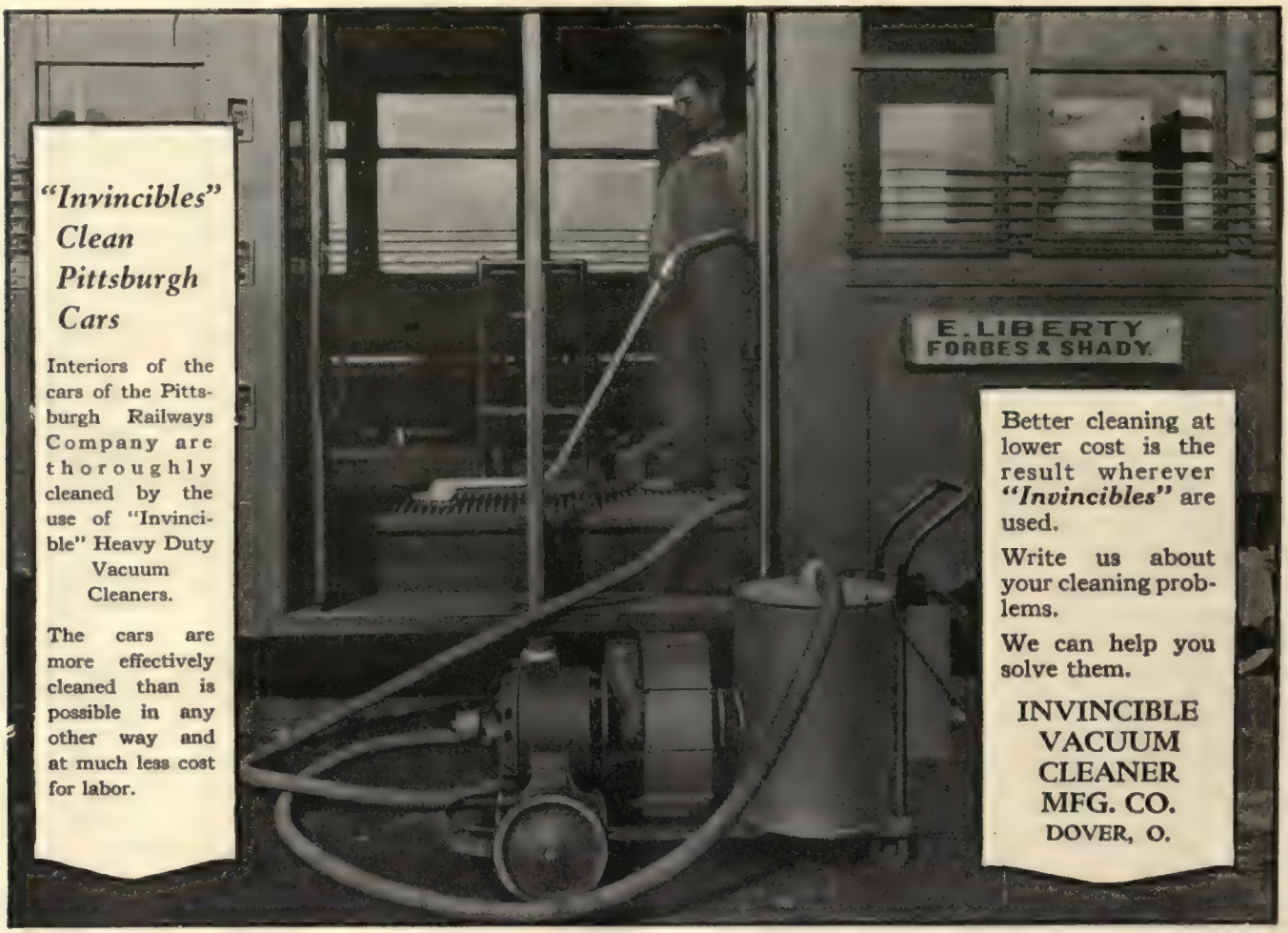


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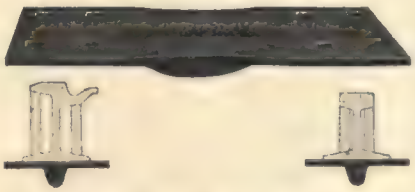

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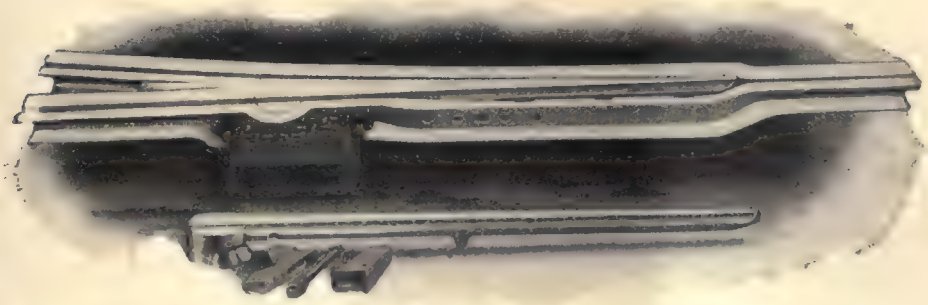

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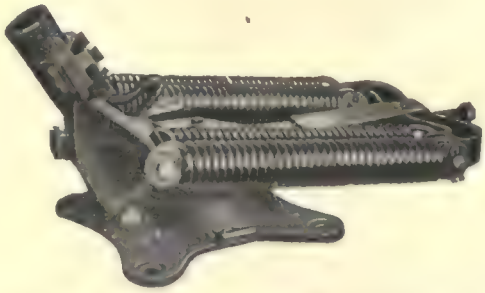

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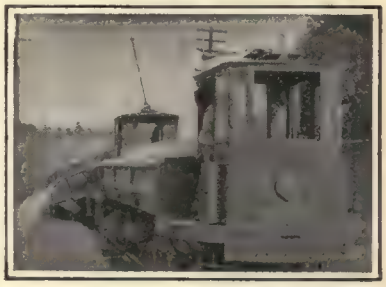

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0131

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FIRST-CLASS draftsman, familiar with steam and electric car truck design and manufacture. Answer stating age, experience and salary expected. P-988, Electric Railway Journal, Tenth Ave. at 36th Street, New York.

## POSITIONS WANTED

ASSISTANT to executive—young man wishes for personal reasons to make change; excellent experience in traffic promotion, tariffs, traffic surveys, accounting, bus development and co-ordination, cost analyses, reports, investigations, employee instruction and public speaking. PW-998, Electric Railway Journal, Guardian Building, Cleveland, Ohio.

ASSISTANT to some busy general manager by technically and commercially trained man. Can assist in modernizing program, or operation. PW-995, Electric Railway Journal, Tenth Ave. at 36th St., New York City.

AUDITOR, office manager, accountant, high class man of executive type, qualified by successful experience with large organizations; particularly trained in street railway work; available on short notice; correspondence invited. PW-985, Electric Railway Journal, 1600 Arch St., Philadelphia, Pa.

ENGINEER, 10 years' experience in design and operation of railway and power equipment, desires position with railway or power company with opportunity for advancement; Middle West preferred. PW-997, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

GENERAL superintendent, technical and practical, competent and successful; fifteen years' experience; salary five thousand dollars. PW-1000, Electric Railway Journal, Tenth Ave. at 36th St., New York.

MASTER mechanic of character and ability, 20 years' experience on city and interurban property, desires to make a change for personal reasons. Best of references, correspondence solicited. PW-993, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

MAINTENANCE of equipment on buses, city and interurban electric cars. I have been very successful in showing low cost per mile with minimum number of car failures, desire for personal reasons to make a change, correspondence solicited, confidential. PW-990, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

PRESENT manager of street railway property in Middle West operating 70 cars and 65 buses, desires change for personal reasons. Forty-five years of age. Twenty years' practical experience. Correspondence solicited. PW-987, Electric Railway Journal, Bell Telephone Building, St. Louis, Mo.


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Mr. MANAGER: If not satisfied with earnings, operating costs, efficiency and co-operation of employes, a reply to this advertisement will put you in touch with a superintendent of transportation with a proven record and broad experience, fully capable of getting results you desire. Fine references. Correspondence and interviews invited. PW-996, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

RAILWAY executive, now employed, desires change; fifteen years' experience on property operating 75 cars; university graduate. PW-999, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

SUPERINTENDENT of railways with 20 years' experience, desires for personal reasons to make change. Nationwide reputation as railway operator, can take full charge. Has ability to handle men and show results. Correspondence invited and treated in confidence. PW-979, Electric Railway Journal, 7 South Dearborn Street, Chicago, Ill.

UTILITIES executive available. Engineering graduate, broad operating and executive experience, railway, also light and power. Young and progressive with tried and proven ability. Railway activities known to the industry. At present employed; seek opportunity with larger interests. The opportunity for past successful methods to produce relatively greater results. PW-972, Electric Railway Journal, Tenth Ave. at 36th St., New York.

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Graduate Electrical Engineer, at present employed with nationally known corporation, desires, for personal reasons, to make new connection.
Nine years' practical railway experience, and seven years' sales experience in electrical equipment. Particularly adapted to railway supply line. Age 36, married. Prefer New York or vicinity. Excellent references.

AS-994, Electric Railway Journal, Tenth Ave. at 36th St., New York City.


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Cars Complete—Low Price—Fine Condition
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is frequently the difference between having good needed equipment or doing without it.

# WHAT AND WHERE TO BUY

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Collier, Inc., Barron G.
**Air Brakes**
Westinghouse Air Brake Co.
**Air Springs**
Cleveland Pneumatic Tool Co.
**Anchors, Guy**
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M Co.
**Armature Shop Tools**
Columbia Machine Works
Elec. Service Supplies Co.
**Automatic Regulator, Voltage, Current & Synchronizing**
American Brown Boveri Elec. Corp.
**Automatic Return Switch Stands**
Ramapo Ajax Corp.
**Automatic Safety Switch Stands**
Ramapo Ajax Corp.
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Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
Illinois Steel Co.
St. Louis Car Co.
Standard Steel Works
Westinghouse E & M Co.
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Timken-Detroit Axle Co.
**Axles, Steel**
Carnegie Steel Co
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Timken-Detroit Axle Co.
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Columbia Machine Works & M. I. Co.
**Badges and Buttons**
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Nichols-Lintern Co.
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Columbia Machine Works
Stucki Co., A.
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Consolidated Car Heating Co.
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Columbia Machine Works & M. I. Co.
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Railway Trackwork Co.
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Cummings Car & Coach Co.
St. Louis Car Co.
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Babcock & Wilcox Co.
**Bolts and Nuts, Track**
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Una Welding & Bonding Co
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Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
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Elec. Service Supplies Co.
Hubbard & Co.
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Westinghouse Tr. Br. Co.
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Cincinnati Car Co.
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Bethlehem Steel Co.
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St. Louis Car Co.
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Heywood-Wakefield Co.
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(Continued on page 52)

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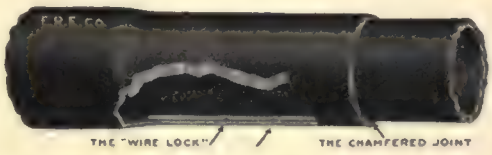


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*Adapted to all Types of rails and paving.*

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Proven by service to economically prevent seepage and disintegration of street railway paving.

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SEARCHLIGHT SECTION

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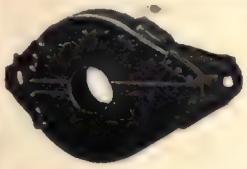

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Invincible Vacuum Cleaner Co.

**Valves**
Ohio Brass Co.
Westinghouse Tr. Br. Co

**Varnished Papers and Silks**
Irvington Varnish & Ins. Co.

**Ventilators, Car**
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Nichols-Lintern Co.
Nat'l. Ry. Appliance Co.
Railway Utility Co.
St. Louis Car Co.

**Vestibule Linings**
Haskelite Mfg. Corp.

**Welded Rail Joints**
Metal & Thermit Corp.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

**Welders, Portable Electric**
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

**Welders, Rail Joint**
Ohio Brass Co.
Railway Trackwork Co.

**Welding Processes and Apparatus**
General Electric Co.
Metal & Thermit Corp.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

**Welding Steel**
Railway Trackwork Co.
Una Welding & Bonding Co.

**Welding Wire**
American Steel & Wire Co.
General Electric Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

**Welding Wire and Rods**
Railway Trackwork Co.

**Wheel Guards (See Fenders and Wheel Guards)**

**Wheel Presses (See Machine Tools)**

**Wheels, Car, Steel & Steel Tire**
American Steel Foundries
Bemis Car Truck Co.
Carnegie Steel Co.
Illinois Steel Co.
Standard Steel Works

**Wheels, Trolley**
Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
R. D. Nuttall Co.
Star Brass Works

**Wheels, Wrought Steel**
Carnegie Steel Co.
Illinois Steel Co.

**Whistles, Air**
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

**Window Guards & Fittings**
Cincinnati Car Co.

**Wire Rope**
American Steel & Wire Co.
Roebling's Sons Co., J. A.

**Wires and Cables**
American Brass Co.
American Electrical Works
American Steel & Wire Co.
Anaconda Copper Min. Co.
General Electric Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Roebling's Sons Co., J. A.
Westinghouse E & M. Co

# Recommended by Proven Merit

## Brill No. 177-E Type Truck

Ready now to meet requirements of light-weight modern car service, this latest type of Brill city truck includes all the well-known patented features which have built up the Brill reputation for long life, low maintenance and smooth and steady riding action. Its solid-forged sideframes, Bolster Guide, Graduated Spring System, Oil-retaining Center Bearing and Half-ball Brake Hangers were developed by Brill engineers through 40 years of the closest contact with electric truck design, and have proven their efficiency through years of actual service in various types of Brill trucks.

In the Brill 177-E truck there is available for light-weight city service a type of truck the performance of which measures up to the highest efficiency essential to profitable modern transportation service.

***Some Electric Railways which have specified Brill 177-E Trucks for their light-weight modern Cars:***

| | No. of Trucks |
|---|---|
| Grand Rapids Railway Co. | 2 |
| United Electric Railways of Providence | 74 |
| Pennsylvania-Ohio Company | 26 |
| East Taunton Street Railway | 4 |
| Virginia Electric & Power Co. | 60 |
| Georgia Railway & Power Co. | 140 |
| Cia Chilena de Electricidad, Santiago | 62 |
| Potomac Edison Co. | 4 |
| Wilkes-Barre Railway Corp. | 20 |
| Dallas Railway Co. | 60 |
| City of St. Petersburg | 16 |
| Williamsport Passenger Railway Co. | 10 |
| Wheeling Public Service Co. | 30 |
| Shreveport Railways Co. | 4 |
| Houston North Shore Railway | 8 |
| Fitchburg & Leominster Street Railway | 16 |
| Cincinnati, Hamilton & Dayton Railway Co. | 21 |
| Honolulu Rapid Transit Co. | 16 |
| Eastern Massachusetts Street Railway Co. | 100 |
| Greenfield-Montague Transportation Area | 4 |
| Rockford Public Service Co. | 18 |

**THE J. G. BRILL COMPANY**
PHILADELPHIA, PA.
AMERICAN CAR CO — ST LOUIS MO — G.C. KUHLMAN CAR CO — CLEVELAND OHIO — WASON MANFG CO. SPRINGFIELD MASS

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"I wouldn't use any axle but Timken." ¶ Thousands of users have that conviction—developed through years of close association; built on actual experience. ¶ With it has grown the belief, based on that same experience, that the silent, long-lived Timken worm is the ideal type of drive.

THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

# TIMKEN AXLES

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